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THE AMERICAN ARCHITECT AND BUILDING NEWS

VOLUME II

1877

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VOLUME II., 1877.

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IF we may trust the newspaper accounts of the tenor of the report (not yet published) of the Supervising Architect of the Treasury Department, Mr. Hill takes the ground of his predecessor, Mr. Potter, in recommending that designs for the public buildings which are built under authority of the Treasury Department shall be obtained by public competition among architects, and that the functions of the Supervising Architect shall be really supervisory. Our readers have probably not forgotten the lively interest which was aroused by the suggestion when it was first made, and the approval which it received from the whole profession, and especially from almost everybody whose experience bore upon the matter; nor yet the two bills which were prepared to bring about the change, by the Treasury Department and the American Institute of Architects, and which, introduced into Congress, were lost in committee. It is encouraging to be told that Mr. Hill, in his turn, comes up to the charge; and it may be hoped that successive recommendations will in time bring the thing to pass. Another change of which Mr. Hill continues the recommendation is, that the work on the government buildings be done under contract instead of by the day. So far as he has been able to try this under the existing regulations, he has found it to be for the advantage of the government. The question is one of some difficulty, and we have never been able to see on which side the advantages or the disadvantages predominated. Any experience that gives clear ground for a decision of the question will be valuable. Mr. Hill is said also to again recommend the building of a new assay-office and a new custom-house in New York, and the selling of government lots in Astoria, Oregon, Bermuda Hundred, Va., Bridewell (Chicago), Ill., the marine hospitals at San Francisco and in Louisiana, and the old New York post-office in Pine Street.

THE Grand Jury of the Brooklyn Court of Sessions have recommended the following precautions against fires in theatres. They demand that in all now existing theatres an iron plating an eighth of an inch thick shall be put upon the side of the proscenium-wall next the stage; and that drop-curtains of woollen stuff be provided, saturated with chemicals which shall "make them fire-proof." The ceilings of theatres should, they urge, be deadened with two inches of plaster of Paris, on iron lathing, and hung by iron rods if they are supported from the roofs. Each division of a theatre should have its separate exit to the lobby or main entrance; and another in some other part of the house for relief, if the first is obstructed. The stairs should be built with treads of blue stone between brick walls, and have platforms at every ten feet (of height, we presume); and, whenever they turn, the platform should be expanded into an entry or lobby, while everywhere there should be hand-rails which could bear a strain of fifty pounds to the foot. Scenery and property not in use should be stored in rooms disconnected from the theatre building, and the wings, cellars, and lofts kept free of combustible rubbish. Steam-heating should supplant the use of stoves, and hydrants with hose be supplied for each floor or gallery and at each end of the orchestra. An attendant fireman with a speaking-trumpet to control the audience, and a description in the programme of all the fire-appliances and means of escape to instruct them in the intervals of the performances, are also recommended. We should not think that these requirements, unless it were the stone staircases and the scene-docks, would tax managers or proprietors very heavily.

SCARCELY had the Brooklyn Theatre disaster come to remind people of the need of exercising some control over the public work of architects, when the almost equally frightful calamity at Ashtabula followed it to enforce the regulation of works of engineering. An iron truss bridge of a hundred feet span, over a ravine sixty or seventy feet deep, broke and let an engine and eleven cars down into the river below. The same day brought the news that a bridge in Vermont had also given way under a train; fortunately in this last case no lives were lost, and the accident attracted little notice. Both accidents may well serve to remind us of a gap in legislation which we suspect exists in all States. So far as we know there are no building laws for engineers anywhere in the country. Certainly there is no effective supervision of their work. The civil engineers of the country are an exceedingly capable body on the whole; but they are not all so, and it is not safe to leave to any body of men such responsibilities without any control. Dams are built by hundreds, railroad bridges are put up by thousands, all over the country: the lives of a great part of the people are at their mercy. But except the railroad or other corporations, whose officers the engineers are that build them, there is nobody whose business it is to see that they are secure. The building of railroads is a venture whose profitableness is always uncertain. Most of the newer ones have failed one or two companies: close economy and temporary sufficiency have been the rule in building them. The engineer may be skilful and his work trustworthy, or the conditions may be reversed. The public knows nothing about it; and some day a Mill River dam gives way, and the flood sweeps off three or four villages; or a bridge drops into a river as at Ashtabula, and a hundred passengers are burned, crushed, drowned, or frozen to death.

THE public has provided no security against the unlimited repetition of such disasters. Its only reliance in a matter which concerns its own life and death is on the skill of a large body of engineers and constructors, and the unwatched watchfulness of those who manage the corporations. There is no means provided of knowing how many bridges and dams are at this moment ready to give way like those at Mill River and Ashtabula. Some States have appointed railroad commissioners; but these occupy themselves chiefly in watching the management of the roads, their combinations and tariffs. They are provided with no means of making, and are not held responsible for making, a rigorous inspection of the construction of the roads. It would be, of course, difficult to prescribe rigid laws for the manner of constructing works which are as various in their requirements and methods as railroad bridges; but it would be quite possible to enforce a careful inspection by competent engineers of any construc-

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tion as it was built, to keep a record of it, and see that it was adequate in the beginning, and was not allowed to deteriorate into insecurity. It would cost something to do it, but the matter is too serious to be neglected. A vast number of such structures have been built all over the country during the last few years. A great deal of the work has been done as cheaply and hastily as possible. Much of it was meant to be replaced before long; but meanwhile railroads have been growing poorer, and are not in haste to rebuild. It remains to be seen how much of it will be renewed in due season, and how much will enforce its renewal by tumbling down.

IT is said that the Strakosch project of a new opera-house in New York, of which we had heard nothing since its first announcement, and which we supposed was ready for a speedy collapse, is still in hand. If it is true, as has been reported, that Mr. William H. Vanderbilt has taken an active part in it, it is very probable that this, or something like it, will actually be carried out. Three situations are suggested for it, — Gilmore's Garden, the open lot opposite the Grand Central Railroad Station, and a lot on the corner of Fifth Avenue and Forty-fourth Street: of these the favorite, on account of its situation, is the last. It is said also that the making of the plans of the building has already been given to Mr. Arthur Gilman. It is perhaps safe to assume, that, if the project is carried out, important modifications of Mr. Strakosch's original *pronunciamento* will be made.

THE *Transactions* of the Royal Institute of British Architects for the year 1875–6, which we have just received, make a volume of some two hundred and eighty pages in the usual quarto form. These published transactions differ from those issued by the French *Société Centrale* and the American Institute of Architects in that they do not contain a record of action or discussion on subjects of current interest in the profession, but rather, after the time-honored fashion of learned societies, series of papers of historical or scholarly, and only occasionally of immediate practical, interest. We do not get from them, therefore, or get only by remote inference, an idea of what the active body of English architects are really thinking about, what kind of work they are doing, and what the effect is upon the present condition of architecture in England. But in their own way these publications always contain valuable material. It is well that in our day of hurried activity, there is a body that reserves time and record for studious work; and the architectural student will find in the various volumes of these transactions, if he is fortunate enough to have them within reach, a very important collection of special studies by the men of highest attainment among the English architects. Some counterpoise in the way of scholarly influence is needed nowadays against the fever of business activity to which architects are given over; and this the course of the Institute supplies. The present volume contains, besides the opening address of Sir Gilbert Scott, the president of the last year, and an account of the presentation of the Royal Medal to M. Duc, a dozen sessional papers read at the fortnightly meetings during the winter and spring. These are mostly archæological or historical, and include Mr. Parker's account of recent excavations at Rome, the interesting paper on Byzantine decoration read by Mr. Pullan, Mr. Fergusson's notable restoration of the Erectheum, which provoked a great deal of controversy last year, papers on Old Cleeve Abbey (an old Cistercian house in England), on Troomal Naik's palace at Madura, on the famous octagon of Ely Cathedral, on sixteenth-century Gothic, and others. Besides these there are one or two papers which bear directly on the practice of the day, — on dwellings for the poor, the National Safe Deposit Company's premises, and a discussion of concrete as a building-material. It concludes with the sketch of the history of the Institute with which the secretary, Mr. Eastlake, introduced the general conference of last summer.

WE have received the first number of an illustrated periodical called the *Useful*, which it is proposed to publish monthly. The purpose of it is "to furnish ornamentation for buildings, decorative painting, and furniture. The plates will consist of scale and perspective drawings of interiors, ornaments of buildings, accompanied by detail drawings of working size." The first number contains six folio pages of photolithographed illustrations, including an interesting perspective interior of the library of Hon. Francis B. Hayes of Boston, two drawings for marquetry and wall-painting, which might be interchanged at will, a bit of architectural carving, and a good design for a sideboard, which is accompanied by a double sheet of clever and spirited detail in full size. There is no letter-press, except the short explanations given with the plates, and the publisher's note on the wrapper, from which we have just quoted. The publisher's address is J. H. G. Monroe, box 2861, Boston Post-Office. The drawings bear the signature of a skilful and well-known designer of Boston, Mr. J. Ph. Rinn; and all the designs, we believe, are his. The mechanical execution of the number is not so good as we should expect from the price ($12 per year, or $1.50 per single number), nor as we hope to see in its successors. The lithographing is rather roughly done, — a thing which does not injure the detail-drawings, but does detract materially from the general drawings. Colored plates are promised in future numbers. We wish our new neighbor all success in a field which is certainly an inviting one.

SALUTATORY.

OUR journal begins its second year with this number, and we venture to say a word in its behalf to our readers. An architectural journal naturally takes a somewhat different character in this country from that it would have in those that are older and architecturally more developed. The profession here is comparatively a new one. It is but lately that any serious attempt has been made to unite its members in a common effort to give it shape, or that its practice has been brought into any real uniformity. Even now there remains a good deal of discrepancy, and there are many points of usage conflicting or uncertain. In design there cannot be said to be any generally accepted methods of work, or canons of criticism, or standard of excellence, still less any thing like concurrence of style or taste. The lines between regular and irregular practitioners, and in many parts of the country between architects and builders, are still somewhat loosely drawn; the bounds of many allied vocations are hardly fixed; and the means of professional instruction are only beginning to be well established. Even the ways of living of our people are only half determined, and their tastes but half developed; so that our habits of building, our methods of construction, our appliances and tastes in decoration, are more unsettled than those of any other country. It follows that many things which in European countries are taken for granted, and passed over because they are things of general agreement, are here still in the field of discussion, and must have their places in our paper.

Moreover, we have no archæology that is of any architectural importance; no architectural history to speak of; few monuments whose interest is more than one of association. Although there is a considerable amount of building on a small scale, mostly domestic, which remains to us from a hundred years ago and more, and which is interesting enough to be recorded and examined with care, there is nothing on which to found any scheme, or important part of a scheme, of study. Architectural education has but lately been put on a solid footing by the establishment of three or

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four well-founded schools in different parts of the country. With these we are beginning to supply, in an efficient way, the professional training which had formerly to be extracted as best it might be from the routine work of a practising architect's office, except for the fortunate few who were able to go abroad in search of it. The present day, then, is one of marked growth and development in architecture among us, and is seconded by a notable access of public interest in it. Every successive brood of young architects comes to its work with advantages over its predecessors, — with better means of training, and more appliances at its hand, under systems of education that are steadily improving, — and is received by a more interested and a more enlightened public. A degree of skill which used to belong only to a very few architects is now within the attainment of many; and, if the general architecture of the country does not yet show an excellence which corresponds with this progress, at least the signs of its coming are here.

Our time, then, is one of peculiar import to those who have at heart the progress of architecture in the United States. Its two points of strongest interest are, the gradual consolidation of the profession, and the education of its younger members. These things we have kept in mind beside and above the general interests of professional journalism: to them we shall continue to give our best efforts, and for them we invoke the special care of our readers.

The success, and still more the excellence, of such a paper as ours, must depend greatly on the active co-operation of those whom its excellence concerns, — the architectural profession, and other men whose special work it touches and illustrates. If architects are interested — and much cordial encouragement from them has shown that they are — in the fulness and quality of our record of what the country does in architecture and kindred arts, the best encouragement they can give to it is by contributing to it their own designs, and giving it the benefit of their experience and study in matters that engage or deserve the attention of the profession. It is hardly possible for editors in their offices, or even with the aid of regular correspondents in a few principal cities, to find out all that is worth noticing, or to put themselves into communication with every one whose help would be valuable to them.

A purely literary paper or a newspaper may rely upon its staff for all the work it has to do. It is easy to keep the run of what is doing in literature: for this, and for the dissemination of general news, ample provision is made in the business arrangements of a community; and, there being for newspapers and reviews a definite work, it is easy to make definite and satisfactory provision for it. But the work of a professional journal, particularly in a wide country where habits of professional intercommunication do not yet largely prevail, and where the work of the profession is mostly private rather than public, and of a kind which does not invite publicity, — the work of such a journal is of necessity somewhat indefinite. That it should be successfully done requires the voluntary co-operation of those with whom it is concerned. For this reason we renew our appeal to our friends, all of whom we cannot hope to seek out ourselves, — first to architects, to whose especial patronage we look, but also to whosoever sympathizes in our objects, particularly to constructors and decorators, — to help us with what information or contribution they may.

It has been our special desire that our journal should not be local or sectional in its scope, but that it should as far as possible represent and attract the architectural interest of every part of the country. It is of necessity more difficult to accomplish this in the parts of the country which are remote from the office of publication than in those that are near it; and therefore it is in distant cities especially that the editors are obliged to look for unsolicited aid.

We are glad to acknowledge here our indebtedness to voluntary assistance in the past. Much valuable aid has come to us from quarters where we had no means of soliciting it. The advantage we have gained from it heretofore is the best indication of its importance to us at all times. One of the pleasant things of journalism is the direct communication it brings with people who are otherwise inaccessible, the acquaintances which it raises up in unexpected places. This benefit is of a kind which is not confined to the editors. A professional journal especially should be a common ground where its supporters can meet, if not for direct intercommunication, at least for free interchange of ideas, where the common activity of those who are interested in the same pursuit can find its representation, and where they may give and receive a steady impulse to unity of effort and mutual help.

DECORATIVE FINE-ART WORK AT PHILADELPHIA.

AMERICAN FURNITURE. — II.

THE representative apartment of Pottier and Stymus, which contained the amaranth bedstead, was finished in a style which some of the ablest decorators in England and America are trying to introduce. The most prominent example of this in the English section was in the exhibit of Wright and Mansfield of London, and, as claimed by that firm, was in the style of the Brothers Adam, who were the fashionable English architects of the latter part of the eighteenth century. This consisted of a section of a wall with double doors in the centre. The style may be called attenuated Renaissance, and was practised only in the interior woodwork of houses. A very pure example of it may be seen in the entrance-corridor of Independence Hall at Philadelphia; but it is not carried to the point of elaboration and fineness of detail that prevailed in English houses. It was a wooden style, and executed in pine painted white or in delicate tints. The example by Wright and Mansfield was an architectural composition in which very small and intricate mouldings were introduced; many of them enriched with carving, which was all executed in *carton-pierre*. The color was cream, and some of the mouldings were gilded. The door-panels were finely decorated, the paintings being executed on plates of copper and finished with a polished surface like enamel. The sample by Pottier and Stymus was much more rich and costly, but not so good in design. The mouldings were generally of chased and burnished brass, like the mouldings introduced by Wright and Mansfield in some of their mahogany furniture. The wood was pine painted white and cream color, and rubbed down and polished. The wall surface in this room was partly covered with upholstery work in blue satin stuffed and tufted, a style of work not defensible under any circumstances, while panels inserted in this bedding were of heavy corded white silk, with painted designs in water-color. These last might have been valuable and effective if treated with the skill displayed by the Japanese in similar work. Nothing could be finer in such a place than the paintings on silk, so many of which were exhibited in the Japanese section. The Adam style, as it is called by the English, hardly bids fair to be generally accepted at the present time. We may prize it in old examples, and admire the refinement of design which entered into the works of its originators; but as exemplified by its champions it is too costly for extensive use, and the whole motive of it is in direct contradiction to the present tendency toward rationalism in architectural design.

The Queen Anne work of Herter Brothers of New York has already been referred to in another place, and hardly needs further notice. It is to be regretted that this firm did not make an exhibit of some of the beautiful work with which the house has been credited during a few years past. Had the work of their able designer Mr. A. Sandier been seen in comparison with that of the English exhibitors, it would have been less easy to concede to them the superiority which their designs in the main portrayed.

The firm of Americanized Englishmen, Robert Ellin & Co., of New York, was the only one in this country to exhibit a piece of furniture which contested with them for the palm at all points. The oak sideboard by this firm was the best piece of furniture in the American department. It erred perhaps in the matter of heaviness, a point which the Englishmen have thoroughly overcome in Gothic and Queen Anne work. Mr. Ellin is a stone-carver by profession, and carving both in stone and wood is the specialty of his firm. In this piece it worthily sustained its already high reputation for wood-carving, and it is safe to say that in this particular none of the English work could equal it.

The chairs and lectern exhibited by this firm were thoroughly Gothic in construction and decoration, and in no way inferior to the sideboard so far as the carving is concerned. A superb example of Mr. Ellin's stone-carving was seen in the stone font exhibited by him; and his partner Mr. Kitsen contributed an *alto-relievo* carved in Caen stone, illustrating the battle of the beasts and birds, which should have been placed in the Art Gallery, but it

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was none the less appreciated though hung in an obscure and disadvantageous place.

The works of Ellin & Co., with the exception of the sideboard, were for ecclesiastical uses and designed in accordance with mediæval precedents. Several other Americans exhibited domestic furniture in which the distinctive forms of Gothic art were more fully reflected than in any of the English furniture with the exception of that of Cox & Sons and Henry Hems. In these as in most of the Gothic work that has been produced in this country, may be seen the influence of the published designs of B. J. Talbert, which have been so extensively circulated. The most prominent object of the class was a black-walnut sideboard designed and made by Daniel Pabst of Philadelphia. The treatment was rather architectural throughout, too much so for practical purposes. Such a heavy piece as this should be built in a house, and not be treated as movable furniture. The wood was filled and highly polished on shellac, as is the common practice of our cabinet-makers with their best work; but this is a method which destroys all the vitality of good Gothic work, especially when vitality is its essential characteristic. The carving was not to be compared with that of Ellin. The hinges and metallic mountings were of oxidized silver of the finest workmanship and spirited in design. All the panels were filled with relief-carving, animal and floral forms being introduced; but these were not all of original design. A noticeable feature was the central mirror surmounted by a crocketed gable, richly carved, with finial composed of two birds resembling pelicans. Four finials on the posts which defined the three main divisions were finished with carved cockatoos. The amount of rich carving far surpassed that on any other Gothic piece in the Exhibition; but in the main it was without purpose or distinctive meaning. Still it was free from conventionalisms and far better than such as was displayed on the oak sideboard in the Belgian department. Mr. Pabst also displayed a Renaissance sideboard, which however has few merits as compared with his Gothic work. His Gothic work reflected the prevalent defects of the revival in the tendency to introduce too many architectural forms pertaining to stonework only. The oak dining-room by Smith and Campion of Philadelphia was on the whole the best exhibit of a full set of Gothic furniture made by any of the Americans. The surroundings and background, though of well-selected paper-hangings, were not such as to make it as attractive as some others; but it was, as it pretended to be, an exhibit of furniture. The set was very large, having two sideboards and a full set of chairs, and included an oak mantel and mirror-frame. Very little carving was employed, and the constructive character of the work was made evident, while it was free from the eccentricities and meretricious adjuncts so generally introduced by cabinet-makers when working in this style. It reflected, more than any thing else in the Exhibition, the influence of Talbert upon American art-workmanship. The exhibit of this firm included a library with furniture of ebonized and gilded wood, a bedroom in black walnut, and a parlor in black and gold. The last three were in the Renaissance style. Their contribution was altogether the largest and most prominent of any of the Philadelphians, and went far to sustain the credit of that city for progress in artistic design. An exhibit made by Brown & Bliss of New York, of extension-tables of the common pattern, contained also four Gothic sideboards, all of good design, but possessed of the faults common to the so-called "Eastlake" furniture.

The carved oak pulpit by F. & H. Schroeder of Cincinnati was not unlike that in the Belgian section. The general design reflected the characteristics of German Gothic of the fifteenth century. The panel carvings in high relief representing scenes in the life of Christ were rendered in a spirited manner, and the carved figures of the apostles at the angles were equally well done. The wood, like all the foreign work in oak, was only oiled, and was not spoiled by too much surface finish. As a work of art it was superior to the Belgian pulpit.

The Exhibition contained several examples of that sort of furniture which, having the appearance of Gothic work, is not designed in the true spirit of the style. These were to be found only in the American department. The revival of artistic furniture, now in progress, is due mainly to the study of mediæval constructions in wood. We are indebted to the research of Viollet-le-Duc, as exemplified in his Dictionary of Furniture, for the most that is known of the subject. The publication of the designs of Talbert, and Charles L. Eastlake's "Hints on Household Taste," have done much to popularize the style, which until recently had only been seen in a few works designed by architects. A popular demand for Gothic work has accordingly arisen, and naturally furniture-makers are eager to cater to this demand. When and how the name has been applied, would be difficult to ascertain; but as if by united accord they have called their manufactures "Eastlake furniture." It is fortunate that we have a term by which to distinguish manufacturers' Gothic from artistic work, though perhaps it is not very flattering to Mr. Eastlake himself to see such productions bearing his name. But if we are to believe what he says, we may infer that he is indifferent; for at the last Social Science Convention he made this remark in his excellent paper on a subject akin to that which we are now discussing: "It is no doubt a little annoying to this or that leader of taste, when he finds his inventions travestied or becoming common property; but after all it is the fate of leaders to be followed, and the fate of the copier to be inferior, and he may well derive satisfaction from the hope that he is guiding the public even after this indirect fashion." We wish that we could feel that Mr. Eastlake is guiding the American public "after this indirect fashion." Whatever good he has done in this respect has only been appreciated by the reading public, who have not sufficient practical knowledge to fully understand his teachings. It is evident from their works that the manufacturers have never read his book, or else they might better be able to cater to the public demand for better things. An expert has only to make the most casual examination of these articles put forth in the name of "Eastlake," to see that they are almost all of them as veritable shams as ever were produced before; and some of the architects' work is not free from the same defects. It is doubtless true that many of the manufacturers are quite ignorant of the fact that the style is based upon constructive principles rather than external form; but it must be admitted that most of them regard the style as a fashion which will have its time like all others. Moreover there is a difficulty directly in the way of the production of good furniture in nearly every shop in the land, and no one can appreciate it better than those who have had to do directly with the designing of furniture. This is found in the lack of skill in our workmen, combined with a prejudice against any innovation upon their old-time processes. It is safe to say that workmen in the present state of the trade take more pride in the performance of some feat which contradicts all the natural properties of wood, or perhaps in the ability to conceal some defect, than in the accomplishment of honest and faithful work. The manufacturers are also unwilling or unable to procure good designs. They ask their designers, long habituated to the conventional shop styles, to do that for which they are not trained; and the result is to make indifferent copies of the designs of Talbert and others, without understanding their meaning, every variation of which is an evident blunder. Regarding this as a new fashion only, the proprietor cannot appreciate that the successful understanding of it requires years of training, study, and research. Of course men who are educated draughtsmen themselves, like Herter and Marcotte, do not fall into these errors; and when they make Gothic furniture it has the true mediæval ring to it. Marcotte produced some excellent Gothic chairs and escritoires long before the so-called "Eastlake" furniture made its appearance. But the generality of manufacturers, even if disposed to do the right thing, do not see any profit in overcoming the obstacles which lie in the way.

We are impelled to offer the above remarks because of the fact that there are those among cultivated people deeply interested in the current revival of art as applied to house decoration, who have not the practical knowledge to discriminate between the true and the false in furniture construction, and are likely to be misled by pretentious exhibits made by those who little understand the meaning and purpose of the revival, but are only on the alert to make money out of it. This state of affairs can only be deplored by all right-thinking people. We will be charitable enough to infer that the most of those manufacturers who have been doing so much to corrupt the taste of the community, and nullify the teachings of genuine enthusiasts, have done so unintentionally and for want of the necessary knowledge and resources. But the time has come when this very community is beginning to discriminate for itself; and its dicta will be conclusive. The genuine reformers, the pioneers who have set the furniture reform on foot, commencing with Pugin, and ending with Morris, Burges, Eastlake, and Talbert, in England, and numbering some half-dozen of the most enthusiastic of our own architects, certainly have cause for resentment, and it is time that they had a champion; for the illustrated journals have of late given equal prominence to the sham Gothic of the merchant decorators, and the choicest works of the most advanced students of the art. Household art has become a fashionable topic of discussion; and through all of it the tendency of the art to fall in a pit on this side of the Atlantic before it is fully developed and popularly appreciated, has never been alluded to. This has not been the case in England, where a higher culture exists among well-to-do people, and where manufacturers have employed the best talent in the production of their works, some of the best of which have been sent to the Centennial Exhibition.

We had intended to offer some critical remarks on some of the exhibits which were excellent illustrations of the faults which have been noted; but after what has been said we do not feel like giving any one the opportunity to say that we are trying to injure his business, and condemn one set for the benefit of another. It is to be hoped that the Exhibition itself has inculcated its lessons to all concerned who are not too dull to draw comparisons between their own works and those of their betters, and that its results may be beneficial in this respect, irrespective of what we have said; all of which has been offered with the best intentions toward those to whom our reflections may apply.

THE BROOKLYN FIRE. — On the night of the fire the fire-plug behind the stage was covered by the scenery for "Julius Cæsar"!

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THE ILLUSTRATIONS.

HOUSE AT RADNOR, PENN. MR. T. P. CHANDLER, JUN., ARCHITECT.

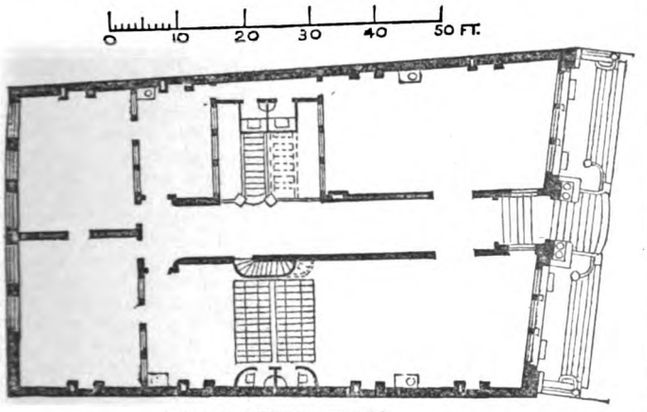
(226 Walnut Street, Philadelphia, Penn.)

THIS drawing represents both the site and house as actually existing. The house is built of gray stone, roofed with slate. One great room stretches along the front with a fireplace in it large enough for a stone seat on either side to be built into the chimney. The ceiling shows the real timbers.

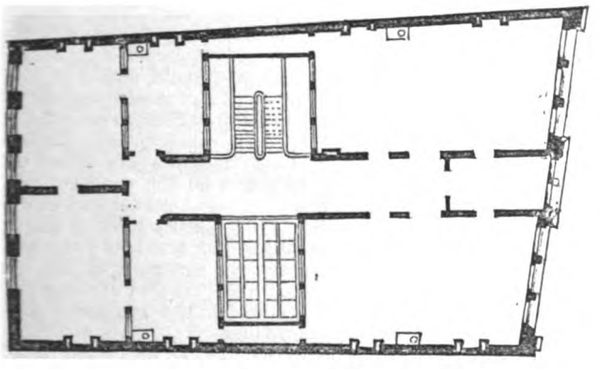
OFFICE BUILDING, NEW YORK, N.Y. MR. R. G. HATFIELD, ARCHITECT.

(31 Pine Street, New York, N.Y.)

The building is of brick with wrought work of Ohio stone and tile decoration.



FIRST STORY PLAN



SECOND STORY PLAN

PORCH OF THE CENTRAL CHURCH, BOSTON, MASS. MR. R. M. UPJOHN, ARCHITECT.

(111 Broadway, New York, N.Y.)

This is one of a series of drawings prepared by members of the Portfolio Club, for the purpose of illustrating the architecture of Boston. The church is well known.

DESIGN FOR A BUFFET. MR. H. E. FICKEN.

(52 William Street, New York, N.Y.)

DESIGN FOR THE ORGAN AT AMHERST COLLEGE CHAPEL, AMHERST, MASS. MR. WM. A. POTTER, ARCHITECT.

(52 William Street, New York, N.Y.)

INDIAN ARCHITECTURE.[1]

MR. FERGUSSON'S great volume on Indian Architecture is a return to the field in which his first literary venture was made. His essay on the Rock-Cut Temples of India, a sumptuous folio with tinted lithographs, was published now nearly thirty years ago, when only a few examples of Indian architecture had ever been seen by European eyes, when photographs were unknown, when the vast distances of the peninsula were yet unspanned by railroads, and at a period when the art of architecture was still regarded with the sort of dilettante approval which well accorded with the ignoble conditions under which it was for the most part practised.

The Handbook of Architecture in two octavo volumes, which all our readers doubtless know intimately, was issued in 1855, and was afterwards expanded into the very complete History of Architecture, so generally in the hands of the profession to-day, in which, however much the impartial reader may resent the occasional dogmatism and prejudice of the author, he is generally glad to admit and avail himself of the accuracy of his statements of facts.

After thus disporting himself over the whole field of the noble art of architecture, Mr. Fergusson now comes back with all the ardor of youth to his old hunting-grounds, and sends forth this ponderous volume of seven hundred and fifty closely printed pages, and four hundred woodcuts, on the temples and tombs and palaces of India and the far East. Clearly this author's heart is in his work; and the persevering labor which he has devoted to a most obscure and baffling branch of architectural study is worthy of the warmest praise. This is indeed no more than may be justly said of his previous works. He has fairly swept the field; and, though succeeding writers may abridge his work, they can scarcely add greatly to it except by the multiplication of examples.

In the present volume Mr. Fergusson has it all his own way. He has told us all we know of Indian architecture, and may dogmatize at pleasure, without serious fear of contradiction. We confess to finding much of the text very dull reading. The desperate character of the chronology and history to which so much of it is given up, the plentiful accounts of the jaw-bone of Buddha, the begging-pot of Sakya-Muni, the celebrated tooth relic, etc., the dozens of unpronounceable names of kings dead some thousands of years ago, conveying no idea of mortal personages, which crowd the pages, afflict and weary the patient reader. Add to this that the author's theories and assumptions are frequently somewhat shaky even to his own mind, whence we meet on every page passages like this: "We are not at present in a position to say, and may not for a long time be able to feel sure," etc. "Negatively, we may probably say," etc.

Mr. Fergusson's classification of the Indian styles twenty years ago was limited to Buddhist, Jaina, Hindu, and Cashmirian. To these he has now added the Dravidian, the Chalukyan, the Indo-Aryan, and the Indian Saracenic. The longest division of his book is given to the Buddhist, the oldest and in some respects the most interesting of the styles. It is rather upsetting to be told that all the Indian monuments now existing are recent beside the Egyptian temples, and that there is nothing in India which goes back farther than 250 B.C. The oldest example appears to be the little excavated temple of Nigope, near Behar, which has a plan of small dimensions and of charming simplicity, consisting of a circular sanctuary twenty feet in diameter, approached by a door from an outer apartment thirty-three feet long, with an arched roof, with a doorway in one side opening through the face of the cliff. This is the simplest and smallest of the Chaitya Halls, so called, of which an uninterrupted series remain, extending in age from the third century B.C. to the eighth century after our era. The largest and finest of these is the cave of Karli, about two hundred years later than the little cave of Nigope, and with a plan exactly resembling in most essential respects that of a Christian church. It is divided by two great ranges of pillars into nave and side aisles, terminating in a semicircular apse with the great *dagoba* or altar at the centre. The roof is a barrel vault, ornamented by circular wooden ribs, and with a semi-dome over the apse. There is a grand porch in front, with square pillars upholding the face of the cliff, and a great window behind them over the doorway. The whole arrangement is, as Mr. Fergusson points out, substantially the same as that of Norwich Cathedral in England, or the Abbaye aux Hommes at Caen. The structural *chaityas*, those built up with walls of human workmanship, have with a single unimportant exception disappeared; but those which were hewn out of the living rock have withstood the storms of time and the fury of war, and remain to-day as perfect in all essential respects as when they were fresh from the builders' hands, though the religion to which they were consecrated, and which held undisputed sway for near a thousand years over the races of men who peopled these vast regions, vanished from the land a thousand years ago. Mr. Fergusson has some just remarks on the exaggerated idea which prevails respecting the difficulty of hewing out these temples and their elaborate sculptures.

"Considerable misapprehension exists," he says, "on the subject of cutting temples in the rock. Almost every one who sees these temples is struck with the apparently prodigious amount of labor bestowed on their excavation; and there is no doubt that their monolithic character is the chief source of the awe and wonder with which they have been regarded, and that had the Kylas been an edifice of masonry, situated on the plain, it would scarcely have attracted the attention of European travellers. In reality, however, it is considerably easier and less expensive to excavate a temple than to build one. Take for instance the Kylas, the most wonderful of all this class. To excavate the area on which it stands would require the removal of about a hundred thousand cubic yards of rock; but as the base of the temple is solid and the superstructure massive, it occupies in round numbers about one-half of the excavated area; so that the question is simply this,—whether it is easier to chip away fifty thousand yards of rock, and shoot it to spoil (to use a railway term) down a hillside, or to quarry fifty thousand yards of stone, remove it probably a mile

[1] History of Indian and Eastern Architecture. By James Fergusson, D.C.L., F.R.S., M.R.A.S., etc. Published by John Murray, London.

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at least to the place where the temple is to be built, and then to raise and set it. The excavating process would probably cost about one-tenth the other. The sculpture and ornament would be the same in both cases, especially in India, where buildings are always set up in block, and the carvings executed *in situ.*"

And of the peculiar adaptability of the rock formation in India to this sort of building, he further says, "The great cave-district of Western India is composed of horizontal strata of amygdaloidal and other cognate trap formations, generally speaking of very considerable thickness, and of great uniformity of texture, and possessing besides the advantage that their edges are generally exposed in perfectly perpendicular cliffs. No rock in any part of the world could be either more suited for the purpose, or more favorably situated, than these formations. They are easily accessible and easily worked. In the rarest possible instances are there any flaws or faults to disturb the uniformity of the design; and when complete they afford a perfectly dry temple or abode, singularly uniform in temperature, and more durable than any class of temples found in any other part of the world."

The chapters on the Buddhist Viharas or monasteries have much that is interesting, but are confused by a mass of detailed description and historical or archæological theory — the latter unsupported for the most part by any thing firmer than ingenious assumption — to an extent which makes them frequently tedious. These monasteries were sometimes caves, generally excavated alongside of a *chaitya*, with the two entrances side by side in the face of the cliff. Sometimes, however, they were built up in the form of many-storied pyramids, each story having a central hall for the assembling of the monks, surrounded by sleeping-cells. Sometimes again, as with those recently excavated near Peshawur, they took the form of a series of courts either square or circular, surrounded by cells, some too small to live in, and apparently intended to contain images, and others evidently used as residences for the monks. All of these monasteries which were built above ground have well-nigh disappeared, but those just mentioned at Peshawur have yielded to their explorers remains of sculpture, and decoration in gold and color, of such richness as to indicate that these institutions must have been maintained in as great splendor as the most luxurious of the monasteries of Italy.

Mr. Fergusson's second book is on the architecture of the Jains. We do not flatter ourselves that any of our readers know who the Jains were; and as Mr. Fergusson nowhere tells us, we may presume it is not necessary that we should know. Between the latest remains of Buddhist architecture and the earliest of the Jains there is a gap of some three hundred years. The characteristics of the latter style are pretty clearly defined. They are, first, the use of the dome, but a dome built with horizontal courses of masonry, converging as they rise, and crowned with a flat stone at top; second, the pillared porches forming the approach to the temples, in which the dome appears carried on eight pillars disposed in the form of an octagon, with the angles filled out, and the sides developed with clusters of other pillars, till the plan of the porch often forms a Greek cross with the dome at the centre, the whole conceived and executed with great freedom and grace, and with extravagant richness of decoration; third, the *sikras* or curvilinear towers, on a vertical basement, square in plan, the basement divided by strongly marked horizontal bands, answering to the entablatures of classic architecture, while the upper or curved portion is as strongly divided by broad vertical bands; fourth, the more or less spacious court surrounding the temple, secluding it from the outer world, presenting an inhospitable wall without, and lined within by an uninterrupted range of small cells.

Mr. Fergusson mentions also as belonging to the Jaina style, a peculiar type of monumental tower, of which only a few specimens remain standing. The two which are here illustrated are singularly graceful and fine.

But it was the Dravidians, whoever they may have been, — for their origin and history are as foggy in Mr. Fergusson's narrative as those of the Jains, — to whom we owe the greatest and most impressive monuments which remain on the soil of India. The Dravidians occupied the southern point of the peninsula, corresponding nearly to what is now the Madras Presidency. Their architectural monuments may be divided into two classes: on the one hand are those cut in or from the rock, of which the best-known is the Kylas at Ellora, a rock-cut temple of most elaborate design, standing free on a vast sunken platform, the rock having been excavated and removed from around it; and on the other the structural temples properly so called, built of stones quarried and laid by the mason's hand.

The first class possess the somewhat factitious interest which attaches to all rock-cut temples, and are often remarkable for great elaborateness and delicacy of sculptured ornament; but are not imposing from their size, or generally interesting from their design. But of the great structural temples, — that for instance at Tanjore with its pyramidal tower eighty feet square, and a hundred and ninety feet high, encrusted with sculpture to the summit; or that at Seringham, with its wonderful group of fourteen or fifteen gigantic gateways or *gopuras;* or Ramisseram, with its four thousand feet of pillared corridors, showing uninterrupted perspectives seven hundred feet long, every pillar a mass of granite sculpture; or Madura, with its *choultrie* or reception-hall, one hundred feet wide and three hundred long, with four ranges of piers, and its great temple hall with a thousand columns whose sculptures, says Mr. Fergusson, "surpass those of any other hall of its class I am acquainted with," — of these works and others as grand, it is impossible not to feel, even from these small woodcuts, the mysterious and indefinable charm which belongs to the work of a race of men of whom we know nothing, but that they have lived and passed away, leaving here the impress of that gorgeous and barbaric imagination which knew no restraint of time or money or human labor, piling its massive stones and setting its myriad pillars, and covering wall and column and roof alike with its wild and grotesque sculpture. Mr. Fergusson has faith that the history of these strange people will not always remain so dark as at present. "New sources of information," he says, "are opening out so rapidly that there seems little doubt that we shall before long be able to recover a perfectly authentic account of the political events of that period, and as perfect a picture of the manners and customs of those days."

The Northern or Indo-Aryan style is that of the Hindoos properly so called. Its temples partake largely of the characteristic of both the Jaina and Dravidian styles; but in the royal palaces of the old Hindoo rajahs we are introduced to a class of buildings of which no example is furnished by any of the styles hitherto treated of, — a class so distinctive and characteristic as to make us wonder why Mr. Fergusson has passed them over so lightly. These palaces date generally from the fifteenth or sixteenth century, and are fascinating from the variety with which the immense masses of building are disposed, the skilful mingling of almost every architectural feature known, — towers, balconies, oriels, gilded domes, — the breadth and brightness of effect produced by the contrast of plain wall with lavish decoration, and the picturesqueness of their sites which seem chosen as much with an eye to pictorial effect as to ease of defence. We should be glad to see the best of these palaces fully illustrated by photographs.

Mr. Fergusson has much more to say of the palaces of the Indian Saracenic style. Here we are led over more familiar ground. The palaces and mosques of Delhi and Agra, the Taje Mehal, the palace of Allahabad, are more or less known to most of our readers through drawings and photographs. They have the characteristic grace and delicacy of Mohammedan architecture everywhere, with an added largeness and expansion caught from the genius of the soil. Of the mosques of Delhi and Ajmir Mr. Fergusson remarks that "as examples of surface-decoration they are probably unrivalled. Nothing in Cairo or Persia is so exquisite in detail, and nothing in Spain or Syria can approach them for beauty of surface-decoration." These mosques are thirteenth-century work; and it is curious to reflect on the contrast which they present in their architecture and in the character and circumstances of their builders to the thirteenth-century work of Europe. The palaces of Delhi and Agra are some four hundred years later, dating from about 1650; and we are not surprised at Mr. Fergusson's enthusiasm over the extent and grandeur of their plan, or the wonderful richness and elegance of the ornament which covers every part of these famous buildings.

We have no space to follow more in detail, as we should be glad to do, this very interesting and instructive work. With all allowances Mr. Fergusson is entitled to the gratitude of all students of architecture for his long labors, and for none more than those which he has given to the preparation of what must have been the most difficult, but what was doubtless to him the most enjoyable portion, of his great work.

CORRESPONDENCE.

OILING SANDSTONE FRONTS. — A NEW CHAPEL. — THE ALDINE. — THE EVENING BULLETIN SUIT. — THE THEATRES.

PHILADELPHIA.

IN view of the fact that several varieties of sandstone still find much favor in the eyes of builders, and that notwithstanding the severity of our winters has in many cases used it very badly, it might have been supposed that ere now it would have been discarded for outside work, or that something would have been proposed to obviate its tendency to shell off from the surface. This is mainly due to the moisture penetrating the surface, and freezing there; the consequent expansion which this occasions in the outer surface of the stone, acting against the rest of the body, causes it generally to disintegrate and separate from the mass, sometimes in large flakes. This is particularly noticeable in outside monuments, balusters to front steps, and, in fact, wherever the stone is quite unprotected. Might it not be very advantageous to saturate the surface in all exposed places with some such material as boiled oil, or a solution of shellac, so as to prevent the entrance of the dampness? It is not unusual in this city to treat brick fronts, both new and old, with a coat of boiled oil; but, to prevent their taking in moisture, several coats are needed. Oil, or some material which will enter the stone, must be used; not paint, which, standing in part on the outer surface, comes away in time, just as the unprotected stone face does. There is on Arch Street a very

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handsome little store-front of Caen stone, which was put up some twenty years ago. Very few winters showed that the material was too delicate for exposure. It soon became stained, and began to shell. It was then painted. The oil penetrated the stone, and left the paint body so largely on the surface, that it soon began to scale away; and only since the building has had its *quantum suf.* of oil, has the surface been in any degree fixed.

This disintegration appears in the façade of the Roman Catholic Cathedral of Sts. Peter and Paul, fronting on Logan Square. This is of New Jersey red sandstone, and was erected from the designs of Mr. Le Brun less than twenty years ago, and has a western exposure.

The fine bronze group of the Dying Lioness, by Wolff of Munich, which was purchased about a year ago by the Fairmount Park Art Association, and which many will remember seeing in its temporary position on a large polished granite base at the south-east corner of Memorial Hall, is to be placed *en permanence* as a central object of the carriage concourse in front of the new entrance gates to the Zoölogical Gardens. The new entrance gates are of wrought-iron work, flanked on either side by a small lodge-house of two stories, each of gray stone and brick, all designed by Mr. Hewitt. The new antelope-house, also by Mr. Hewitt, is nearly under cover; and there is every prospect that a new aviary, by the same architect, will be commenced in the spring.

On the north side of Pine Street, between Nineteenth and Twentieth Streets, the old parish of Christ Church is erecting a small chapel from drawings by Mr. J. P. Sims, a brother of the late Mr. Henry Augustus Sims, who during his short career in this city did so much towards awakening our people to an appreciation of architecture as something more than a mere heaping together of building-material. The walls are of brick, outside red with bands of black, and inside Newark buff with bands of red; the string-courses, window heads and jambs, and other ornamental work both inside and out, are of Chicago terra-cotta. What would be the pendant-post of an ordinary hammer-beam roof, in this case has been continued down to the floor, which has enabled the builders to set up the roof-framing prior to completing the walls. The plan is very simple, being little more than a parallelogram divided into four bays, — a system of timber framing beneath one set of the principals forming the chancel arch.

The large building so well known as the Rush Mansion, on Chestnut Street near Twentieth, has been very considerably remodelled by Mr. A. B. Jones. The building was purchased about a year ago by Mr. J. B. Lippincott, the publisher, with the view of altering it into a hotel. It has a frontage of 103 feet, and depth of 76 feet, with a fine garden in the rear. Four stories have been added above the original four, and a dome-like construction above the central portion. A large main entrance has been added of cast-iron work. The general finish is a very simple character of French Renaissance. There will be about one hundred rooms in the house; and it will be called the Aldine.

The libel case of Messrs. Struthers & Sons against the *Evening Bulletin* has attracted no little attention, not only among the building portion of the community, but a large number of the average tax-payers, who begin to feel some interest in getting the worth of their money, so much of which is going into the work at the intersection of Broad and Market Streets. In their specialty, that of furnishing the finished marble-work for the new Municipal Buildings, this firm have the largest single contract ever awarded in this country. This trial, which has occupied the court for the past six weeks, was ended on Dec. 13; and the following morning the sealed verdict was opened, allowing Messrs. Struthers & Sons one cent damages, while the newspaper is rendered liable for the costs. The suit arose from certain articles published in the *Bulletin*, in which attention was called to the sizes and quality of the marble which the contractors were putting into the building; denying the right of a simple agreement between the architect (Mr. John McArthur, jun.) and the contractor, to take precedence of the written contract, endeavoring to rouse public feeling against them by throwing suspicion on the character of their work on the building, and in one article actually charging them with fraud.

Apropos of the work on this Municipal Building, the chairman has lately reported that the amount needed to carry on the work during the coming year would be $1,338,000.

The new bell for Independence Hall, which was presented by Mr. Henry Seybert, and sounded for the first time on the Fourth of July, seems to have the Fates against it. After being on duty in the belfry for about a month, its sound was deemed unsatisfactory, the tone being so low that it was taken down and returned to its Trojan founders, Messrs. Meneely & Kimberly, to be re-cast. This has lately been accomplished, only to find a defect in the interior, which involves a second re-casting; so that the city will be without its bell for another month or more.

Philadelphia has come in for her share of agitation on account of the late Brooklyn horror, and the building-inspectors have been roused to unwonted energy in making their round of examination. The result has been mainly a recommendation of the use of lever instead of flush bolts, for the outside doors, in some of the principal theatres; while two or three of the third-rate establishments have been denounced as regular fire-traps. Kiralfy's Alhambra, on Broad Street, was referred to as being one of the safest places of the kind in the city; but this is exceedingly difficult to realize when one regards the flimsiness of its construction, and the great amount of jig-saw work which goes to make up its decoration, and that of the balconies of the garden adjoining. After the official assurances of these gentlemen that Philadelphia theatres are in the main reasonably safe, it is by no means reassuring to read such a communication as appeared in the *Times* lately, to the effect that not only beneath the stage, but under the auditorium also, of certain of our first-class theatres, there are to be found perfect labyrinths of dressing-rooms and rubbish-holes, full of inflammable material, in close proximity to gas-stoves and unprotected burners. Why has no hint ever been taken from the system observed in most of the European theatres, where the curtain is never raised to an audience except there be in attendance behind the scenes a squad of *sapeurs-pompiers*, fully equipped for any emergency? The efficiency of the well-known Babcock Fire-Extinguishers may have been thoroughly established; but how many instances have there been since their introduction where they have been left in their places to be consumed with the rest of the building, generally on account of its being the business of no one in particular to remember them at the proper moment, and bring them into service?

BLACK BRICK.

POUGHKEEPSIE, N.Y.

EDITOR OF AMERICAN ARCHITECT.

Dear Sir, — Will you by letter or through the columns of the *American Architect* inform me the process of making black brick for building-purposes?

What would be the result of dipping hot bricks in coal-tar? will they stand the weather? A SUBSCRIBER.

WATER-GLASS.

THE EDITOR OF THE AMERICAN ARCHITECT.

Sir, — I was much put about after the long storm of a week or two ago, to find that in several cases the rain had driven clean through the freestone dressings of walls, and wet the plaster and inside finish. I was led to remember that the Germans had used water-glass or some like substance to coat outside stonework or terra-cotta, and to wonder why we could not find something which would serve us in the same way; but I cannot find anybody who knows any thing about it. Please propound in your paper next issue the inquiry whether anybody has any knowledge in this line which he can place at the service of the profession.

Yours very truly, C.

NOTES AND CLIPPINGS.

PANICS. — The panics that have occurred since the Brooklyn fire show how urgent is the necessity that the owners of halls of assemblage should, without awaiting an order from municipal authorities, take pains to assure the public that their buildings are as safe from fire as human ingenuity can make them. It will be years before the people of this generation can go to places of amusement with as much *insouciance* as possessed them a year ago. Four needless panics have lately taken place, — at Washington, D.C., at Newark, N.J., at a theatre in a town in Maine, and at Montreal, Canada, where the fall of a piece of woodwork from the upper gallery gave rise to the belief that it was giving way, which of itself was enough to create a panic without the thoughtless cry of "fire" that some one uttered, in all of which several persons were injured. A fifth panic occasioned by the breaking out of fire in a Sunday school at Danville, Ill., was unattended by casualties, owing to ample means of exit from the building.

FIRE-PROOF SCENERY. — In the process invented by Mr. Dion Boucicault for rendering stage scenery, etc., fire-proof, the canvas and ropes are soaked in a solution of tungstate of soda, and primed when dry with silicate of soda. The woodwork is made fireproof by soaking it first in a solution of tungstate of molybdenum. This method is said to be inexpensive. It was subjected recently, in New York, to the following test: A large piece of canvas had been prepared, and, in the presence of the spectators, a jet of gas several feet long was directed upon it through a blow-pipe nozzle. The canvas not only did not ignite, but for a considerable time no effect whatever was produced, except that it became somewhat black with the smoke. At length, the material having become thoroughly charred, Mr. Boucicault punched a hole through it with the gas-nozzle; but the edges did not kindle in the least degree, an indication that the solution had entirely permeated the texture. Similar experiments were made with ropes and wood washed with the solution, but they could not be made to ignite. The flame directed upon them was thought to be one hundred times more powerful than any flame which could possibly come in contact with any stage scenery.

NO STAGE DOOR. — The Theatre of St. James was originally built by the famous vocalist Braham, and when it was finished the builder discovered that there was no stage door — no stage entrance from the street. Some adjacent property had to be purchased to complete the edifice; and although it is perhaps the prettiest theatre in London, it is the most inconvenient in the way of entrances.

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MOVABLE ROOFS. — An occasional correspondent writing to the New York *Times* mentions a new invention, of which we should like to have a more detailed description. He says: "The leading theatres of New York are better constructed than ours in London, and have wider halls and passages; but it seems to me that the model theatre has yet to be built, and it should stand in an open space, with room and appliances to open the house all round as easily as they move the roof at our Canterbury Hall — a sort of rival Alhambra on the other side of the Thames. The architect and engineer, adopting an idea they picked up in Paris, have fitted this music-hall or theatre with a movable roof, which can be manipulated by a child as easily as was the great blast at Hell Gate. An infant can make the Canterbury Hall roofless in a few seconds, so that in the summer the performances can go on as if they were held in the open air, on the plan of the grand classic theatres of Athens; and even in the winter, when it is not snowing or raining, it is a great treat between the acts to have the atmosphere of the place purified by opening the top of it to the heavens. I commend this excellent arrangement to the enterprising managers of New York, where your more equable atmosphere is so much better adapted for a theatre with the roof off than ours. The movable roof is patented here, but the credit of the suggestion is due to France."

THE LATE GALE IN VERMONT. — During the severe gale on Dec. 29, the steeple of the Baptist Church at Bennington, Vt., was blown over and entirely demolished. This edifice was built in 1846, and soon afterward a storm overthrew the steeple; and the present one was built with a view to its being able to withstand any gale. The bell, weighing 2,500 pounds, fortunately did not hit any thing in its descent, and lies upon the ground uninjured. The other parts of the church escaped serious damage. Valentine's knitting-mill had two chimneys, one measuring fifty feet and the other eighty feet, blown over upon the wing of the mill, crashing through the roof and two heavy floors, utterly demolishing quite a quantity of valuable machinery, besides ruining that part of the mill building. At Rockwood's mill the chimney, some seventy-five feet high, fell, carrying roof and machinery through two floors.

FALL OF A CHIMNEY. — On the morning of Dec. 26, the huge cone-shaped chimney of the glass-works of Gillinder & Son, Philadelphia, fell, doing damage to the extent of $5,000. The chimney was 100 feet high, and 20 feet wide at the base. The accident was caused by allowing the fires to go out on Saturday, when the extreme cold weather contracted the bricks, thus rendering the supports for the immense weight of the chimney inadequate. No one was injured.

CONVENT BURNED. — The monastery at St. Elizabeth, Canada, which burned on the 25th ult., causing the death of many of its inmates, was a wooden structure. The fire originated in some inexplicable way between the floor and ceiling.

THE NAVAL MONUMENT AT WASHINGTON. — Workmen are now driving piles at the great gate of the Capitol, at the end of the avenue where the bronze monument of the Navy and Peace is to stand.

AN ENGINEERING FEAT. — A recent change of grade on Mission Street in San Francisco, Cal., necessitated the lowering of a water-pipe some 26 inches. The pipe itself was 22 inches in diameter. It was made of wrought iron, and weighed nearly 60 pounds to the foot, making the weight of the whole in the vicinity of 60,000 pounds. On Saturday afternoon, Dec. 16, a force of about 100 men was set to work to uncover the pipe line, and dig a trench under it to the required depth. As the work progressed, heavy joists were placed across the trench at distances of 40 feet, and the pipe suspended by means of heavy screws resting on the joists. At ten o'clock on Sunday every thing was in readiness. In half an hour the water-gauge showed that all the pressure was gone, and the pipe free of water. Twenty-five of the most intelligent workmen were selected to work the screws and lower the main. The circuit of the lever was marked off in quarters, — one, two, three, four; and at each signal from a trumpeter stationed at the lower end, and directed by the engineer of the company, Hermann Schussler, the workmen simultaneously made a quarter of the circle, and then called out the number. This operation was one requiring the utmost caution, as the difference of a turn or two of the screws between any of the workmen would so unequally distribute the strain as to break the pipe. In fifty minutes the main rested on its bed, the ends were riveted, the water turned into the pipe, and the feat accomplished. Sunday was selected for the work, as on that day there is less water used than on week-days, seldom exceeding 10,000,000 gallons.

CAST-IRON ROOFS. — The *Scientific American* says that iron is more used for architectural purposes in America than elsewhere, but not always in such a manner as to render the building fire-proof. While corrugated iron roofs are an excellent protection against sparks, they yield too readily to any more intense heat. The Germans, who have generally employed tiles, and make the buildings themselves capable of sustaining such roofs and even heavier ones, are now introducing cast-iron plates for roofs. Those made at the Greditz Iron Works weigh from 35 to 44 ounces each, and cover a surface of 8 x 10, or about 80 square inches, making the weight 4 to 5 pounds per square foot, or 25 kilogrammes per square mètre. A square mètre of roofing-slate weighs 25 to 30 kilogrammes, and of tile 57 to 60 kilogrammes. The plates have projecting edges so they fit very tightly, and are held in place by two wire nails beneath the lap.

A LARGE LENS. — M. Tell, the celebrated Paris glass-worker, has just finished casting the crown glass lens for the great Vienna refractor. It is twenty-eight inches in diameter, and weighs one hundred and twelve pounds. It is to be sent to Mr. Howard Grubb, in Dublin, who has the flint lens with which it is to be combined.

THE TALL CHIMNEY AT GLASGOW. — The foundation of this chimney was laid in March, 1857; and on the 6th of October, 1859, the coping was added at the top, at a height of 468 feet from the foundation, and 454 feet from the level of the ground. At the foundation the outside diameter is 50 feet, and at the surface it has diminished to 32 feet, while at the top of the coping the diameter is 12 feet 8 inches. On the 9th of September, 1859, and while the chimney was still unfinished, and therefore before the mortar was dry, a storm occurred which resulted in swinging the chimney out of the perpendicular to the extent of five feet at the top. This accident, though perhaps directly due to the storm, had its origin in a neglect in the building process. Proper allowance had not been made for the contraction of the mortar used in setting the bricks; and as a consequence a certain number of planks were under a great pressure, being arched in the centre. Suddenly one of these at one side gave way in the oscillation caused by the storm, and with the unequal pressure the chimney was then forced from the perpendicular to the extent above stated. That the accident occurred in this way, Mr. Joseph Townsend ascertained by personal observation. For a time some fear was entertained that the whole chimney would come down; but on the 21st of the same month measures were taken to prevent this, and by the 1st of October, the whole was restored to the original upright form. This was effected by sawing the chimney on the side nearest to an imaginary straight line. The following figures give the intervals at which cuttings were made:

1	128 feet from the top.	
2	49 feet below	1
3	22 "	2
4	15 "	3
5	12 "	4
6	19 "	5
7	20 "	6
8	13 "	7
9	20 "	8
10	30 "	9
11	40 "	10
12	40 "	11
13	41 "	12
	419 feet.	

A PERMANENT REFEREE. — A somewhat novel step has been taken in connection with trades-unions in England. The executive committee of the Durham Miners' Association and the coal-owners of that district have jointly appointed a barrister, with a salary of £300 a year, to sit as an independent person to hear evidence upon any dispute that may occur between employers and employed.

CLOCK DIAL. — It was stated in a recent number that the dial of the new clock at the Crystal Palace, Sydenham (forty feet in diameter) was the largest dial ever constructed. It is said, however, that the cathedral at Mechlin has a dial measuring forty-nine feet in diameter.

GARDENS OF THE LUXEMBOURG. — The gardens of the Luxembourg have just received a monumental fountain by the late sculptor Carpeaux, and a group by the late sculptor Perraud.

A NEW ELECTRIC LIGHT. — Herr Denayrouze has made several trials of Jabloschkoff's electrical lamp in regard to its light-giving capacity, and offers the following report to the French Academy of Science. This new lamp consists of two carbon points fastened parallel a short distance from each other, and separated by a substance which is burned at the same rate as the carbon points. When the electrical action commences, the spark flies from one carbon point to the other, by which means the uppermost rim of the isolating substance is gradually burnt, thereby exposing new surfaces of the carbon to the electrical action, as in a wax candle the wax gradually disappears, permitting the wick to burn. By this means, regulators for keeping the carbon points always at the necessary distance, which arrangement we find in other electrical lamps, are avoided. This invention offers many other advantages. The heat developed by the combustion of the carbon points, which in regulator lamps is radiated into the air, is here used for the melting and volatilization of the isolating substance. The combination of this substance is very various, as most earthy substances can acquire an electrical affinity. Substances looked upon as infusible are volatilized by bringing them into the interior arc of the flame. Denayrouze and Jabloschkoff use for isolating substances sand, glass, mortar, sealing-wax, etc. The simplest and at present cheapest mixture consists of sand and powdered glass. This mixture is not claimed to be the best which can be found. Double the light obtainable with any other apparatus depending upon the regulator is given. If this new invention should in future prove satisfactory, a new impulse will be given to the industrial use of the electrical light, and this method of illumination will, no doubt, gradually supplant gas in manufactories, railroad stations, and other establishments.

WHEN TO PAINT YOUR HOUSE. — The *Technologist* states that paint applied to the exterior of buildings in autumn or winter will endure twice as long as when applied in early summer or in hot weather. In the former it dries slowly, and becomes hard like a glazed surface, not easily affected afterwards by the weather, or worn off by the beating of storms. But in very hot weather the oil in the paint soaks into the wood at once, as if into a sponge, leaving the lead nearly dry, and ready to crumble off. This last difficulty, however, might in a measure be guarded against, though at an increased expense, by first going over the surface with raw oil. Furthermore, by painting in cold weather the annoyance of small flies which invariably collect during the warm season on fresh paint is avoided.

THE TURKISH DAY. — As the hour after sunset is the first hour of the Turkish day, and as this hour varies from day to day, all timepieces are unreliable; and hence public clocks are unknown in Turkish towns.

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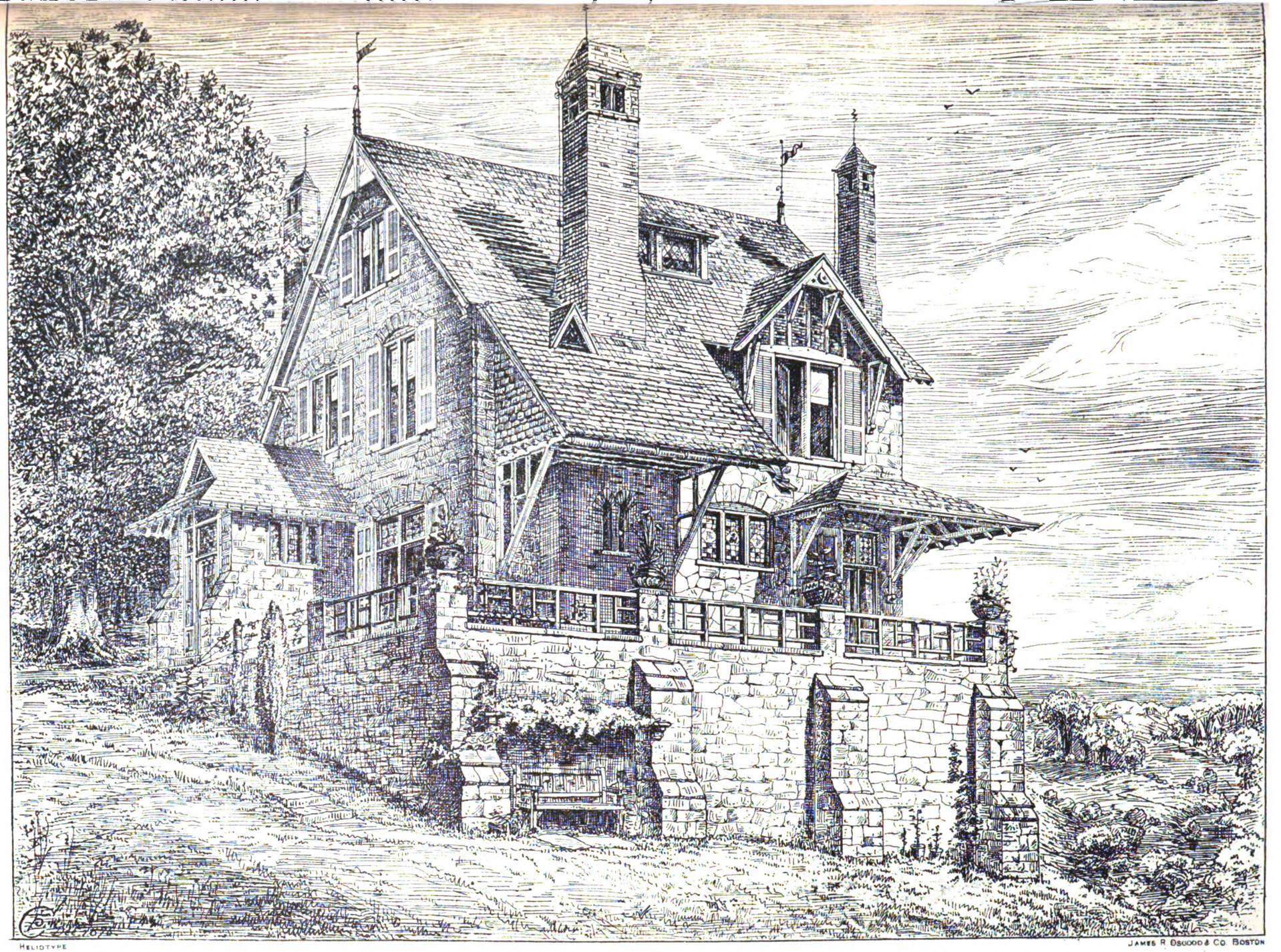
American Architect and Building News. Jan. 6. 1877.



Heliotype

James R Osgood & Co. Boston

House at Radnor, Pa.

T. P. Chandler Jun. Archt.

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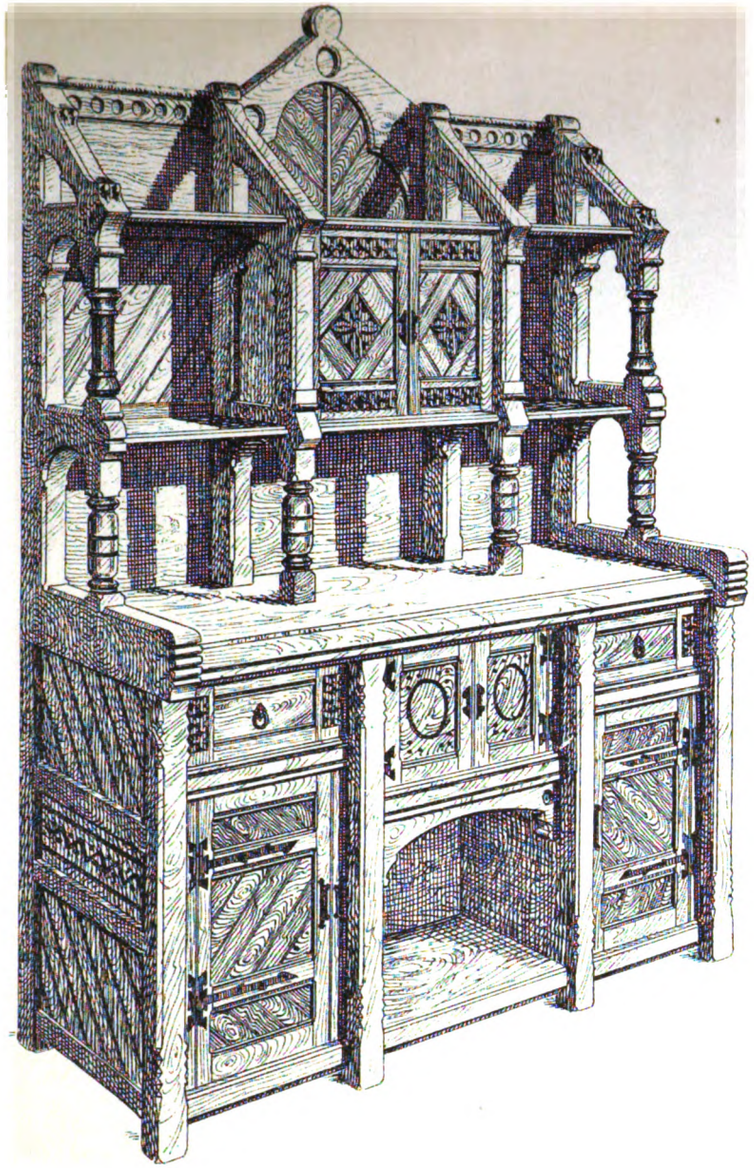

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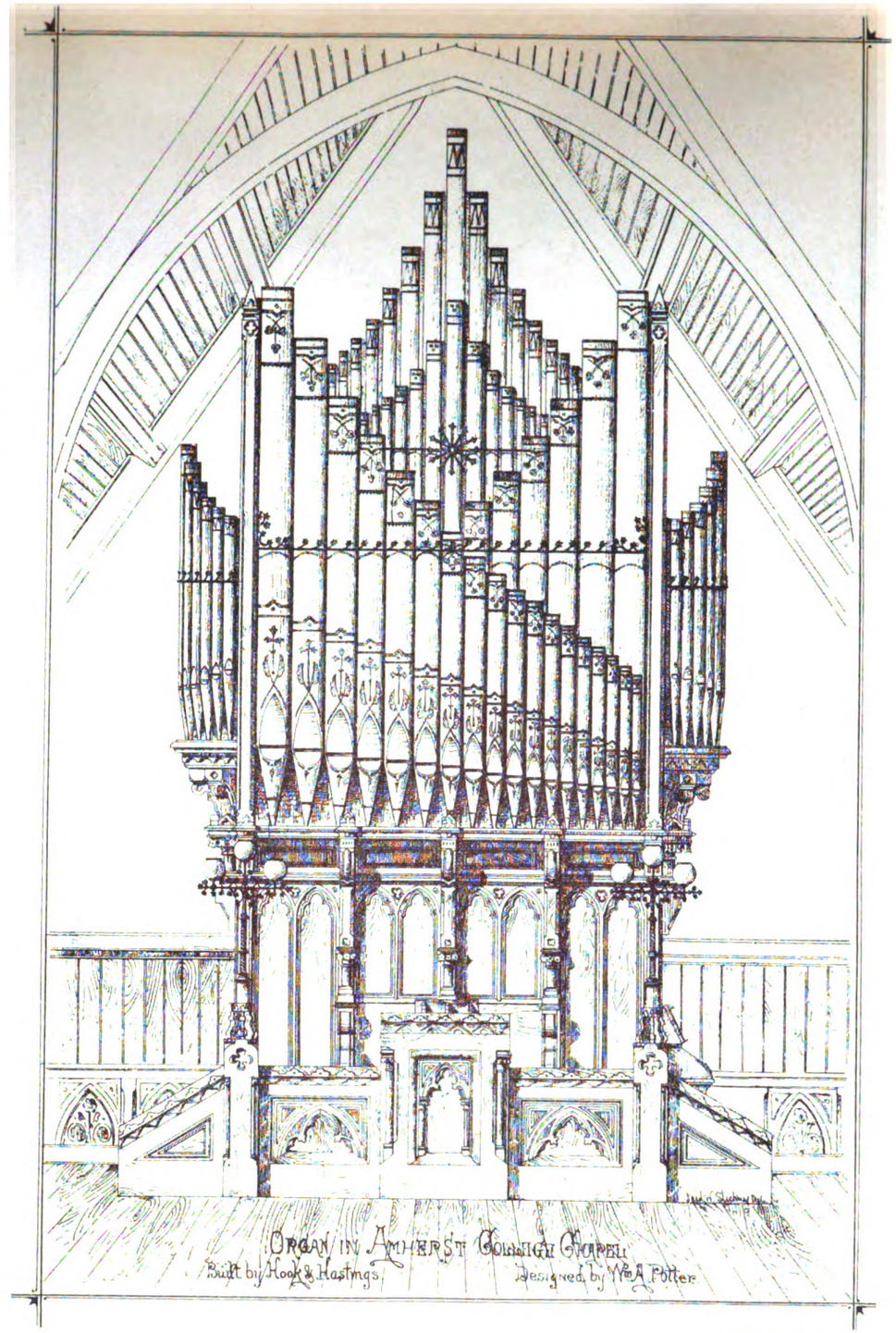

ORGAN IN AMHERST COLLEGE CHAPEL.
Built by Hook & Hastings. Designed by Wm A. Potter.

JAMES R. OSGOOD & CO.

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STREET SKETCHES BY L.S. IPSEN. 1875.

CENTRAL CHURCH

BERKELEY STREET, BOSTON.

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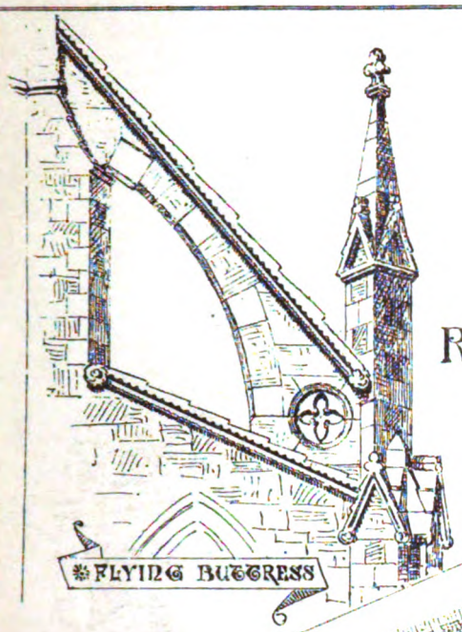

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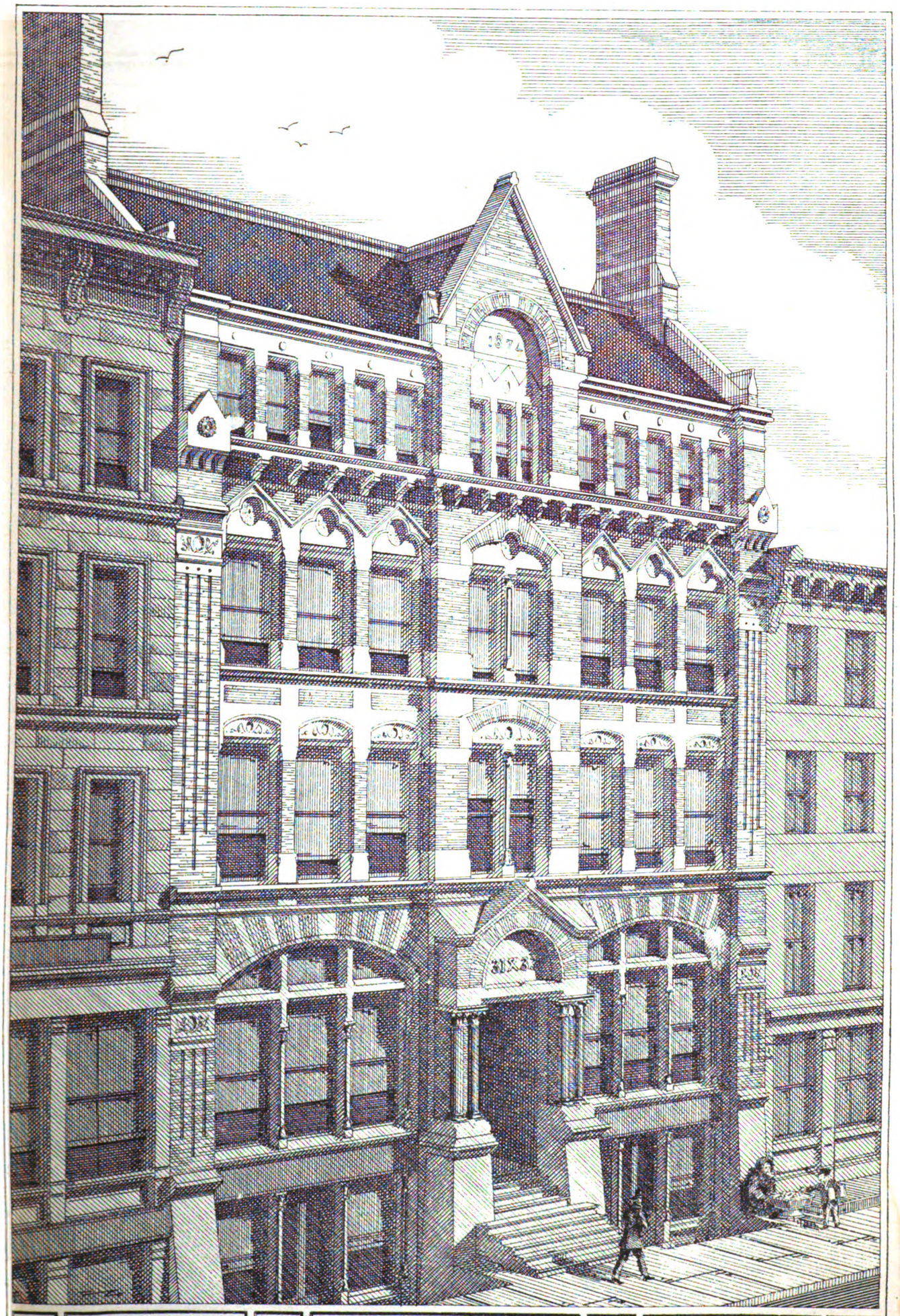

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THE lesson of the Brooklyn Theatre is taking effect in municipal orders for the security of theatres in various cities. The precautions thus taken are naturally not of a radical kind, being merely such partial remedies as can be applied to the defects of existing theatres. The real improvement is a thing of time, and is to be looked for in supervision of the planning of theatres, as new ones are built, or old ones rebuilt. The New York Superintendent of Buildings has ordered a number of alterations in the theatres of that city, chiefly in making new outlets, and in enlarging those which exist. The Academy of Music is ordered to have additional stairs to the mezzanine boxes and to the gallery; the Park Theatre to have an additional exit from the upper galleries; Wallack's, which is a rather desperate case, is to be relieved by three new window-outlets; and the Union-square Theatre by new openings from the first and second galleries, and doors and bridges. Other theatres are to be altered in similar ways. In Cincinnati the Common Council appointed a safety commission to examine and report upon the means of egress from theatres, halls, and churches. They have examined a number of public buildings: the only one of these to which they had on their first examination given a certificate of safety was the Grand Opera House, and this on condition of certain precautions. The proprietors of four theatres, one hall, and one church, were summoned to answer for the lack of security in their buildings.

A SIGNIFICANT commentary on the unsuitable situations which theatres were allowed to occupy is that in several of the cases in New York the officials have found no way of providing the necessary escape except through adjoining buildings, or over their roofs. Thus the window-escapes ordered for Wallack's are on both sides upon the roofs that adjoin it; the new exit to the Park Theatre is to be into the adjoining building or its yard; exits are to be made from the dressing-rooms of the Stadt Theatre to the neighboring roofs; one side of the Union-square Theatre is to be emptied by a bridge into the windows of a building at its side, and others in like manner. This sort of thing seems to us particularly objectionable. The conditions that make it necessary ought to be done away with as soon as possible. To say nothing of the danger of discharging a panic-stricken crowd upon high roofs or bridges, there is the danger of having these outlets blocked by changes in the neighboring buildings, unless these are put under oppressive restrictions, the risk of fire being carried into the theatres if the buildings should take fire, unless the communications are very securely guarded, and the danger that they will be found impassable in an emergency if they are. There is also the danger of injury to the adjoining buildings from the sudden rush of the crowd into them, and the certainty, almost, that the fire would follow them if the theatres should burn. A theatre under these circumstances becomes a more uncomfortable neighbor than ever. The danger and inconvenience are more than it is reasonable to impose upon abuttors, and we should think they would have a right to protest against them. The only proper remedy would seem to be in a gradual extinguishment of the licenses for theatres in situations where they must be closely packed against other buildings, and in restricting them henceforth to places where they can have their sides exposed and their exits clear. This is a reform which demands legislation, and can only be gradually accomplished. It is to be hoped that public interest in the matter will not subside till something decisive is done toward insuring it.

IT is said that the State Capitol of Indiana is becoming so unsafe that the examining architect has condemned it, and the legislature propose to abandon the use of it, and seek for security in the new court-house of Indianapolis. The walls of the building, it seems, are badly cracked, the roof framing is decaying, and the large cupola sways and totters in the gales till it is thought dangerous to be under it. We do not know how old the Capitol of Indiana is, but its age cannot be great, for the State itself is only sixty years old. Its dilapidation must therefore be the consequence of bad building. If the dome should tumble down some day, its fall might possibly produce a beneficial revulsion against the belief that a dome is a necessary feature in a state-house. How it came to be so is not recorded, but in the common prejudice a dome is as indispensable to a state-house as a cue to a Chinese head. A curious instance of this prejudice is said to have appeared in arranging for the plan of the new Capitol at Hartford, Conn. Mr. Upjohn, we are told, in preparing a Gothic design for it, naturally made it without a dome. But the building committee insisted that a state-house always had a dome, that no state-house had ever been built without a dome, and that theirs must have one; and Mr. Upjohn was obliged to add one to his design. As long ago as 1873 the legislature of Indiana ordered that designs for a new state-house should be procured; and several designs were submitted to the legislature of 1875, but nothing was done towards carrying out any of them, nor was one adopted, we believe. In his recent message to the legislature, Gov. Hendricks has again called their attention to the want.

THE report for 1876 of the superintendent of buildings of Chicago shows an amount of building which is surprising, considering the business depression of the year. 1586 buildings were put up with a total frontage of 43,222 feet, and a cost of $8,270,600. Of these 713 were of brick, and 873 of stone or with stone fronts. Ten were public buildings, and ten churches; 137 were "stores;" 225 were dwellings with shops attached; over a thousand were dwellings alone. Nearly seven hundred were three stories high and upwards. The efficiency with which the building-laws are enforced may be inferred from the fact that 2,058 notices for violation of the ordinances were served, and in 2,044 of them the ordinances were submitted to on notification. The officers of the department of buildings are, one superintendent, one secretary, one inspector of public buildings, one inspector of roofs, and six inspectors of buildings. Inasmuch as it is the duty of the department to watch all buildings that go up, and prevent violations of the building-acts, to take charge of the removal of wooden buildings, to investigate all fires, and record the causes, losses, and insurance, in a city whose fire-limits include thirty-six square miles, there is evidently work enough for them to do, and apparent reason for the recommendation of the superintendent that the inspectors should be provided with horses. A very good recommendation also, for any city, is that plans of all theatres, public halls, churches, and schools, should be procured and kept on file by the city, and should show their seating-capacity, and provisions for extinguishing fires. The plans would be open to public inspection, and, being modified whenever alterations were made in the buildings, would be always a record of the condition of all places of public meeting, as well as a security for their being arranged and provided as they ought to be. We commend the suggestion to the attention of other cities.

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AT our time of writing, the expected message from the President on the Isthmus Canal project has not yet been sent to the Senate; but the tenor of the report of the commission which examined the different surveys, and the treaty which has been negotiated with the Nicaraguan Government, have been made known through the daily papers. The commissioners, Commodore Ammen, Gen. Humphreys, and Capt. Patterson, have recommended the Nicaraguan route; the President takes a strong interest in the project, and the proposed treaty is the result. The route chosen is from Greytown on the Atlantic coast by the river San Juan to Lake Nicaragua; thence across, or rather along, the lake, and down to the Pacific coast at Rio del Brito, utilizing the course of the Rio del Medio and the Rio Grande. The whole length is something under two hundred miles, of which only about sixty is by artificial canals, and about equal distances by the lake and by "slack-water" navigation in the San Juan. There is no tunnelling in the route as we understand it. The elevation to be overcome is but little over a hundred feet, and will require fourteen locks at each end. (Commodore Selfridge's route by the Napipi required three miles of tunnelling and two hundred feet of lockage.) The Nicaraguan route has the advantages of availing itself more than the others of the natural waterways of the country, of an inexhaustible supply of water for lockage, of moderate elevation, and lockage concentrated at each end where it can be overlooked and managed by a moderate because not dispersed *personnel*, and of long reaches of river and lake which will require little or no watching. The estimated cost is reported at fifty millions of dollars, to which, it is said, the President wisely adds an equal sum for contingencies.

ACCORDING to the report of the treaty it is guaranteed that the ports at each end of the route shall be neutral territory, and that the guaranty shall cover a distance of one hundred miles out to sea, and a hundred miles along the coast on either hand and at each end. A specified belt of territory bordering upon the canal through its whole length shall also be neutral ground; and within these neutral limits the ships or property of all nations which shall participate in building the canal are to be exempt from capture, blockade, or any other embarrassment. To secure this participation in behalf of the chief commercial nations of Europe, the State Department has been in communication with their governments. Great Britain, which indeed was committed to an interest in the establishment of such a canal by the Clayton-Bulwer treaty of 1850, has after some hesitation signified her readiness to co-operate in the undertaking; and Germany and Russia are reported to have done the same. France has not yet given a response, it is said, which is not unnatural, perhaps, considering that her *savants* have just been urging our Government, through M. Léon Drouillet, as our readers will remember, to adopt the Atrato route of Señor Gogorza. Italy and Austria also seem to be backward in promising support. It is a question how much money is likely to be forthcoming under immediate prospect of a European war.

THE vexed question of the decoration of St. Paul's, London, is again brought forward in a published letter to the Dean by Mr. Oldfield, a member of the committee appointed to take charge of the work. Mr. Oldfield has been making an examination of the decorations of the principal Renaissance churches in Italy, with the hope of evoking some precepts that would guide in the treatment of St. Paul's. He has not come back provided with a definite scheme for the whole cathedral, but recommends that the dome, which is clearly the commanding feature for decoration, be attacked first, and that the decoration be in mosaic. That mosaic should be used, is the prevailing feeling at this day, and was, as is well known, the desire of Sir Christopher Wren. Mr. Oldfield's conclusions are, that figure-subjects in mosaic should be arranged on the surface of the inner dome "in formal if not actually geometrical compartments, distributed equally around the vault in accordance with its structural uniformity;" that the figures should be designed "with severe statuesque simplicity, and as far as possible in one plane" (meaning, we suppose, as if on one spherical or spheroidal surface); that they shall be boldly executed in mosaic of large *tesseræ* and on a gold background. All this appears reasonable enough as far as treatment goes. He recommends a competition between Mr. Leighton, Mr. Watts, and Mr. Poynter, with liberal compensation; each artist being required to submit a colored drawing for his whole scheme, and a section of it in full size, which can be fixed temporarily in its place, and so judged from below. Considering that ordinary pictorial mosaic costs from two to three pounds per square foot, and that the work being on a large scale would be more easily and cheaply executed, he thinks that the whole decoration of the cupola might be executed for less than thirty-four thousand pounds.

MR. OLDFIELD clinches his proposal by saying that "it would be no small advantage in commencing our work, that we should not need an architect to furnish us with a design; for thus we should not merely avoid considerable expense, but escape the almost insoluble difficulty of finding any member of the profession who would at the present time be acceptable to all sections of the subscribers." This is of course in remembrance of the trouble incurred when the arrangement of the decoration was put into the hands of Mr. Burges, and when the opposition excited by his project was found to be so great that it was withdrawn. That, however, was a not unnatural result, in a war of styles, of putting the decoration of a Renaissance church into the care of a pronounced mediævalist, even an artist of so acknowledged power as Mr. Burges. The difficulty is that to definitely fix the decoration of the dome of a large church by itself, in the hope that the rest of the interior may be subsequently adjusted to it, at a different time, and possibly by different hands, is giving hostages to fortune in an extremely hazardous way. To decorate a building is to arrange a complicated scheme in which its architecture should play the ruling part; and the supervision of an architect is therefore almost indispensable to it. Moreover, the special usefulness of an architect in supervising any scheme of general decorative treatment is exactly this: that his experience habituates him to arranging a multitude of diverse elements and features of design with reference to a general effect, and on a large scale, as no other artist has to do in the same degree or on the same scale. Painters, sculptors, decorators even, work on parts of a whole, or on a whole of comparatively small dimensions; the architect alone is used to controlling and harmonizing every detail of a large and complicated structure into the unity of a single effect. Herein more than any other artist he has his whole training in his favor, and, other things being equal, he is most likely to succeed.

ARCHITECTURAL STUDENTS. — VII.

THE architect must sketch, both as a means of acquirement and of expression, — to record what he sees, and to work out his ideas with freedom in designing. But though everybody talks about sketching, and almost everybody tries to do it, there is so much misunderstanding of what it really is, or at least so much difference in the use of the term, that it is worth while to consider what shall be understood by it.

A common notion is that a sketch is an incomplete drawing, or perhaps a rough drawing; but a sketch, in the proper artistic sense of the word, differs from a drawing in kind rather than in degree. To draw is to represent, as well as drawing-materials will allow, the whole aspect of a thing. In imperfect drawing one goes as far toward this as his means, his time, or his skill permit. To sketch is to select some particulars of one's subject, and reject others, with reference to a preconceived effect. The sketcher chooses some few characteristics or a single characteristic and sets it forth with as much decision as possible: the draughtsman represents his subject as completely as he may under the circumstances, and stops. The essence of the sketch is in the selection of elements and in the combination of them, so as to produce a single impression decided upon beforehand. A sketch is one-sided, a drawing incomplete. It follows therefore that there will be more diversity among sketches than among drawings. In drawing, the thing to be done is always the same; the difference is in the mechanical devices and methods of execution; but in sketches the things

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which the artist sets himself to represent are different, and there are as many ways of sketching a thing as there are artists to sketch it.

When the draughtsman begins to select he begins to sketch. An artist will not select things simply for their obviousness, nor because they are easy to render, but for their significance in the character of his subject or for their importance to the particular effect he wishes to produce; and in his slightest sketch he may seek out some very subtle and difficult quality of his subject rather than any easy or obvious one. The success of a sketch then depends on the skill with which the chosen characteristics are represented, and combined into a single telling impression; its value on the whole will depend very much on the excellence or importance of these characteristics themselves, — on the feeling and knowledge that guided the artist in selecting them. In an article on architectural etching (No. 19, May 6, 1876), we dwelt somewhat on the difference between a painter's choice in sketching and an architect's. The architect naturally concerns himself with objects of design, and the design of them is the thing he keeps in mind; their forms, the niceties of their proportion, the character and adjustment of their detail, are the things on which he fixes his attention. The painter, especially the landscape-painter, who is most in favor now, thinks more of accidental characteristics, — of effects of light, the marks of age and dilapidation. If the arrangement of his picture wants a higher tower he lifts one up, with little heed to its architectural proportion; if he wants a more overshadowing cornice he thrusts one out, and does not concern himself about its proportion to the base mouldings below. But an architect represents the things he draws with more reference to their essential than their accidental aspects. Nay, their accidental aspects may interfere more or less with what he is after; and he may therefore disregard and strip off the very things that the painter would most wish to give. Accidental effects of light or color, the mouldering of age or marks of violence, may be in his way. For his purpose it may be necessary to make prominent what the painter would subordinate or even leave out, to sink what he would lift into importance. The architect's business is first of all with design, and even with the design as it was intended to be, rather than as it appears when outside circumstances have obscured it. When he draws or sketches a building or any work of art, he therefore follows its form into detail with faithful precision, as far as he goes, and traces the intention of its design with the same observance that the painter gives to the look that nature bestows upon it. Hence the architect's aim is simpler and more uniform than the painter's; and two architects, whatever their difference in manner, would be much more likely to agree in the substance of their sketches than two painters. The interest of the architect's sketch is more entirely in its subject than the painter's, and less in his way of looking at it. If it were not for talking slang, we should say that the architect's sketching was more objective, and the painter's more subjective. Hence the architect perhaps subordinates himself more entirely to his subject, even though his pursuit of it may lead him into certain conventionalisms, and make his presentation of it less naturalistic than the painter's. The red color of a roof will be more important to the painter's eye than its exact pitch, the stains and lichens on the wall than the bonding of its masonry, the scars of its history than the enrichment of its mouldings. To the architect this is all the other way. Of course it is very desirable that he should not be insensible to the qualities that attract the painter. Perhaps his training is too apt to make him so. So far as he can compass them in his work, without neglecting those which it is his special part to secure, it is the better for him; to neglect them entirely is sure to injure his sensitiveness, and to narrow him. We enlarge on these distinctions because many people forget them, and are disposed to look for the same qualities in architects' drawings or sketches that they find in painters', and to find fault if they are not there; whereas it is hardly possible that the architect, beginning with a different aim from the painter's, should not reach a different result.

Since the merit of sketching is in the merit of the selection which it indicates (and in the skill with which the selected points are set forth), it follows that it requires knowledge of the subject. We have argued more than once that practically one cannot draw well any thing that he is not familiar with. An absolutely perfect draughtsman could probably do this; but we are not concerned with him. It is not likely that even he could sketch perfectly what he did not know. For in order to know how to select what is most characteristic in any thing, we must know its character. We doubt if any man altogether unfamiliar with watches and with machinery would, in looking at a watch, detect that the most active member in it was the immobile mainspring. The utmost precision of eye and hand might enable a draughtsman who did not know the human figure to draw it satisfactorily, by making his drawing as comprehensive as possible; but this would not teach him to cull for a sketch the subtle indications from which the practised eye would catch the action of the figure. This can only come of thorough familiarity. The same thing is true of foliage, or of architectural detail. These considerations bear upon a question which concerns the student, one which has been considerably discussed, — whether we should learn first to draw or to sketch. Mr. Ruskin and his followers argue that one cannot sketch properly till he can draw well. The French theory is, that one must learn to sketch first, or he will never learn it. Logically it would seem that Mr. Ruskin's position was the stronger; but it may be urged that though one must know the whole to be able to select the most characteristic parts, after long training in complete representation only he will find it extremely difficult to restrict himself to a limited selection. The faculty of choice also needs training. Practically we think it will be found best, — is the common experience, in fact, — that drawing and sketching should go hand in hand. And we recommend the student to accustom himself from the beginning to do both, and with the same subjects; to draw a subject faithfully, and then to sketch it. While it is fresh in his mind, and familiar, let him consider carefully what are its characteristic points, and set them down as simply, straightforwardly, and carefully as he can, rejecting all others. Then let him draw another subject, and sketch that; and so educate himself simultaneously in both, that his drawing may be discriminating, and his sketching characteristic and decisive. In this way his knowledge, his judgment, and his power of rendering, will grow together.

There is a popular and foolish admiration for slightness and dash in sketching. It comes partly, as Mr. Ruskin says, from indolence in the beholder, who does not want the trouble of looking into a picture or a careful drawing, and in great part also from the admiration which every one feels for the decisiveness of confident knowledge. But there is a confidence of contented ignorance as well as of knowledge, and it is rather the more plentiful, in drawing as well as in other kinds of work. There is a charm in simplicity and directness of statement; but it is thrown away unless the statement be true, and worth making. Unluckily, inconsiderate persons are too apt to be more pleased with the boldness of the assertion than critical of the thing asserted. A really careless sketch is good for nothing; or, if it has merit, it is only by virtue of some grace or power that pierces through its carelessness, and reveals itself in spite of it. A sketch may be neglectful, deliberately neglectful, of the most that there is in its subject, and yet be as good as a sketch can be, if the few things that are chosen are set forth with the right force and feeling; but this implies a concentration of care, conscious or unconscious, upon these things. But a negligent sketch, one with which the maker does not take pains, is always poor. The more you strip away from your subject, the more important it is to see that the things you keep shall be of value. Next to direct falsity, the worst offence of a sketch is emptiness: whether it appears in the guise of careless dash or of laborious puttering, this is alike offensive. On the whole, the emptiness of impudence is rather more offensive than that of painstaking insufficiency. The tendency among draughtsmen to a dashing execution, without having any thing to tell, gives just the air of empty-headed positiveness which is most annoying to intelligent people. The swagger of the cheap swell is even more intolerable in art than in society.

We counsel the young draughtsman, therefore, not to set his heart upon what the French call *chique*. It simply means to him display; and, sought for its own sake, it means display of emptiness. When a man has any thing decided to say, and knows his means of expression, he is

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pretty sure to say it with spirit, if there is any spirit in him. If there is none, he will not succeed in counterfeiting it. Nor can he counterfeit knowledge any better. Ignorant people may be tricked into applause; but knowing ones will see through him. Sketching is not a careless or a lazy or an easy occupation. It may be quick and decisive, but it demands extreme care. The lazy man will do better in drawing. The cardinal quality of a sketch is concentration. Hence the whole of it must be foreseen from the beginning. Every unconsidered or unnecessary touch in it is an impertinence. The less there is in it, the greater care is necessary that that little shall be good. It is too much the habit to stint in quality as well as in quantity.

DECORATIVE FINE-ART WORK AT PHILADELPHIA.

AMERICAN FURNITURE (*Concluded*).

ONE of the most prominent objects in the American rooms of the Art Annex was the carved Gothic frame on the full-length portrait of a "Princess of Roumania" by G. P. A. Healey. This frame was worthy of notice as a work of decorative art; and, as easel pictures are generally treated as furniture by their owners, there seems to be no reason why this should not be included in the same category. The frame was of extraordinary size, and rather overawed the picture that it contained. Considered by itself, it was a magnificent example of Gothic decoration. It was designed by John Addison, architect, and carved by James Legge, both of Chicago. The material was butternut, on which American carvers so much delight to exercise a freedom which is often restrained by harder woods. As this was the only example of Mr. Legge's work in the Exhibition, so also was it one of the finest that he has produced, and was the only work of the kind that could stand comparison with that of Ellin, with whom Mr. Legge was once a partner. The work of both went to show that training in architectural carving is, after all, the best to fit men for the finer qualities of work required for furniture, and enables them to outstrip the professed furniture-carvers with ease.

One of the eccentricities of the Exhibition was a display of furniture "in the style of 1776," by George J. Henkel of Philadelphia, and might fitly be called an example of the "American Renaissance style." It showed how little can be done in the way of imitation by one who does not understand the true spirit of what he is imitating. This was nothing less than a caricature of the substantial surroundings which our ancestors possessed. The fact that it was made from an old maple-tree which grew in Independence Square could not lend sufficient sentiment to the subject to redeem it from this charge. The examples of reproductions of the same style by the English firm of Wright & Mansfield showed what could be done in this way by people with good understanding, and made Mr. Henkel's attempt appear all the more abortive.

There were quite a number of musical instruments which displayed considerable artistic design in their cases, though most of them were of the old conventional styles, varied only by greater elaboration. The amount of bad design and inartistic work put upon the latter was sad to behold. Many of the cabinet organs and upright pianos were, by the desperate expedients of their designers, made to resemble sideboards rather than musical instruments. A few of the parlor organs had very good Gothic cases, among which might be mentioned one by George Woods & Co. of Boston, and another by the Mason & Hamlin Organ Co. of New York. A constructive character in such instruments is not inappropriate.

As in the construction of a piano it is essential, for obtaining clearness of tone, that all the woodwork shall be as if in one piece, it is conceded that all the devices of constructive woodwork are inexpedient. The more simple and smooth the treatment, the more rational is the design of such an object. Carving and projections are manifestly out of place; mouldings are neither useful nor artistic. The only resource left is surface-decoration, and this is best produced with inlays or painting. There were a few good examples among the pianos exhibited by the Americans, of this treatment. The finest were the pianos of ebonized wood, decorated with artistic inlay work in bright-colored woods, exhibited by Albert Weber of New York. We understood that these cases were designed and made by Herter Brothers. One ebonized piano by Hardman, of New York, was inlaid with ivory. There were also two ebonized and inlaid pianos by Decker Brothers of New York. All of these showed a decided advance in this branch of art-workmanship.

Any account of artistic work at Philadelphia would be incomplete without mention of the samples of chairs manufactured by the Shakers at Mount Lebanon, N. Y. Nothing could be more utilitarian than these goods. They carry the illustration of the principles of perfect construction and adaptability to use to the farthest possible point. And more than this, there is not the slightest touch given them that could be called ornament. Yet no one can say that the element of beauty is wanting in them. It is this unconscious beauty which makes them works of art. In this they are the best possible demonstration that the art principle is derived from the best adaptation of means to an end, combined with the most perfect execution. This is what is known as the rationalistic definition of art, and the Shaker chairs illustrate it in the simplest way. In execution they are faultless, for they are the work of a conscientious people; and these people happen to be singularly innocent of all artistic intentions. In fact, their whole life and religion are a protest against art. These chairs are too familiar to need description. They may be found in almost any well-ordered household. But too often they are only bought as curiosities, or for the sake of saying, "We have a Shaker chair." Therefore one or two seem to be considered enough for a house. Yet they are the best dining-room chairs ever made, and are worthy to stand beside the works of the best manufacturers. Already some of the manufacturers have begun to imitate them, and many who suppose they have Shaker chairs are imposed on. But the imitations have never equalled the originals in perfection of workmanship and finish. The chairs on exhibition were in three colors, natural maple, stained maple, and ebonized. Some of the coverings were of thick stuff, in colors sometimes harmonized with good effect.

The display of upholstery work in the American department was quite as varied as that of the furniture, furnishing a few, very few, examples of tasteful hangings and coverings, and many of those monstrosities of upholsterers' ornamentation which appear as if no one could have produced them unless possessed of a depraved taste combined with a disordered brain. Of such sort was an exhibition of upholstered chairs and sofas by a Philadelphia house which it is best to leave unnamed. Chairs were covered with several colors of satin, inharmonious in combination. The uncomfortable backs were like great tufted rosettes; lines of tufting, spread out like rising suns, covered backs of sofas which followed the sinuosities of contorted and agonized woodwork, until the beholder felt like rushing away as from a nightmare. One exhibitor from New York showed a curtained bay-window (in a glass case) hung with rich satins, velvets, and fringes in good combination of color. This had some good points in the valance treatment in the upper part; but when invention failed to supply more combinations for the complication of immense tassels, he used wooden poles for cords, and made tassels of satin and velvet, hanging down below the vertical poles like collapsed conical tents, the bottoms sprawling over the floor to trip up the unwary. This illustrates the error of those who think that art means complication rather than simplicity. The leather hangings of C. R. Yandell & Co., of New York, were much admired, as they deserved to be. This firm have introduced some of the most exquisite patterns of stamped, gilded, and colored leather, that have ever been produced. We can safely assume that the display of leather curtains made by this firm was intended rather as an array of samples than a composition to be recommended for use. As such it was the richest thing of the kind in the Exhibition. The composition was artistically made, but would not be appropriate for window-hangings. The American upholstery generally considered was far behind that of the English in artistic arrangement, though the latter did not make a very extensive exhibit.

A comprehensive view of the whole collection of furniture, foreign and American, reveals the condition of the arts applied to furniture, as nothing but an international exhibition could. First, as regards material, it is seen that the Italians and Americans use black walnut mostly; the Continental countries employ ebonized wood and oak. It is clear that the former is the fashion, as is shown in its use for cabinet pieces; while oak maintains its position as the standard wood for all articles of solidity and permanence, herein asserting its pre-eminence as the noblest of woods. England contributed her portion of ebonized wood and oak, and in addition those artistic combinations of rare and richly colored woods for which her manufacturers are becoming famous, in which the essential beauty of marquetry or inlaid work is seen to pervade the whole piece. Among the Americans, after black walnut, of which about three-quarters of all the exhibited pieces were made, the materials were as various as the styles. The leading houses had examples of ebonized work, showing that what has been a general fashion in Europe has been imported. It is still a novelty here where but few purchasers can made up their minds to have rooms furnished with black. There were few examples of American oak furniture aside from the exhibit of R. Ellin & Co.; and there can be no better evidence of the backward condition of furniture-making in this country than the slight use made of oak. There is perhaps no country in the world more rich in the production of this material, and more ignorant of the proper way to prepare and use it. Our workmen protest that it will never stand; so when a piece is ordered, if they can have their own way, they will glue and patch together several pieces of oak for each single piece that they should use. The effect of the beautiful grain is therefore lost, and with it all impression of solidity. The facts are that they will not take the trouble to procure wood of the required sizes, and try to make every thing out of inch boards, whatever the design. Many of them, when compelled to use the proper-sized pieces, have so little judgment and experience that disastrous results often follow. As the manufacturers want so little of this material, the lumber-dealers do not feel justified in keep-

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ing well selected and seasoned stocks: consequently when a good lot of oak is wanted, it cannot be had. We are told that black walnut is the only material kept on hand, and well seasoned. Consequently very much work which would be preferred in oak is perforce executed in walnut. White walnut, or butternut, has recently come into extensive use in this country, and can now be had in good quantities and well seasoned. It is remarkable that so little of it was seen at the Exhibition. The picture-frame designed by Mr. Addison was the only piece of this wood that we remember to have seen.

The American ebonized work by leading firms was quite equal to the foreign, the woods used being generally cherry, but in some cases white holly and pear-wood. The Italians finished their black walnut only in oil or wax, and without polish. The only piece of American walnut finished in wax was the sideboard by Pottier & Stymus. All the other American walnut work was filled and polished. The foreign oak furniture was invariably finished with oil or wax, and without filling, which is the only proper treatment. The prevailing error in all American work was too much polishing and filling, often used to cover up inferior workmanship.

Second, as to style, it will be seen from what has been said in previous papers, that most of the work from the Continent of Europe was in the latest rendition of the Renaissance, which is characterized by fineness of detail and delicate carving, and freedom from clumsy and pretentious ornament. The European feeling was well reflected in the Renaissance work of Marcotte and Pottier & Stymus, while but little of it was seen in the works of any of the other exhibitors. There was no evidence in the Exhibition of any tendency toward the revival of a Gothic or constructive furniture on the Continent, the only taste for such forms being manifested in a rage for procuring genuine old pieces. On the contrary, in England the tendency is to revive all the old styles indiscriminately; and the making of furniture in the Gothic and Queen Anne, Elizabethan, or Jacobean styles, as well as in the style of the Georges, is going on all at once; and this is all done by enthusiasts bent upon a great reformation. It is hard to tell which has the ascendancy.

The Gothic revival in America was commenced by members of the architectural profession, under the inspiration of Viollet-le-Duc and the contemporaneous works of the English architects. It has found its imitators among the furniture-manufacturers, who only give us part of the shell and none of the kernel of the nut. This has proved so disgusting to people of taste and judgment, that a very few of the conscientious manufacturers like Herter of New York, and Fiedler and Bates of Chicago, have taken up the Queen Anne style, freely treated, and worked on constructive principles. (The last two firms were not represented at the Centennial.) This last movement cannot fail to produce good results. The work done by Cottier & Co. of New York is also exciting a considerable influence among the wealthy and refined people of that city to whom they cater. Their black and unfilled oak is a specialty, and likely to be more extensively used by others. Their style would be hard to describe, but it certainly has the virtue of demanding straight wood for its execution. These influences are all running counter to the heavy and vulgar renditions of the French Renaissance, which are the stock in trade of nineteen out of twenty of our manufacturers. The Exhibition, taken altogether, has set people to thinking on this subject, and cannot fail to have a good influence in improving the taste of the mass of visitors who saw it, notwithstanding the mass of trash that was exhibited.

THE ILLUSTRATIONS.

HOTEL ELIOT, BOSTON HIGHLANDS. MR. J. H. BESARICK, ARCHITECT.

(32 Pemberton Square, Boston.)

THIS hotel, commenced in 1874 and completed in 1875, is built of face brick with brown sandstone and black brick trimmings, laid in black mortar. It contains fifteen suites of rooms, two elevators, and all modern conveniences complete, and is owned by Dr. J. P. Paine.

DESIGN FOR MEMORIAL MANTEL, KAPPA ALPHA LODGE, WILLIAMSTOWN, MASS. MESSRS. POTTER & ROBERTSON, ARCHITECTS.

(52 William Street, New York, N.Y.)

This mantel, to be placed in the dining-room of the Kappa Alpha Lodge now building at Williamstown, Mass., of which an illustration was given in Vol. I. No. 22, has been given by Mrs. Isaac Brunsen as a memorial of her deceased husband, a late alumnus of Union College. It is to be finished in oak with carved panels as suggested in the design.

HOUSE FOR T. B. MACKAY, CAMBRIDGE, MASS. MESSRS. PEABODY AND STEARNS, ARCHITECTS.

(60 Devonshire Street, Boston, Mass.)

DETAILS OF THE NEW OLD SOUTH CHURCH, BOSTON, MASS. MESSRS. CUMMINGS AND SEARS, ARCHITECTS.

(9 Pemberton Square, Boston, Mass.)

We give this week a drawing prepared by Mr. W. Whitney Lewis for the Portfolio Club.

AMERICAN INSTITUTE OF ARCHITECTS.

ABSTRACT OF MINUTES OF BOARD OF TRUSTEES, A. I. A.

Meeting held at the Institute rooms Thursday, Nov. 16, 1876. — The Secretary presented a letter from Dr. Migerska, Chief Commissioner of the Austrian Commission to the Centennial Exhibition, dated Nov. 7, 1876, on the subject of the gift of the Austrian Society of Engineers and Architects to this Institute, together with a list of the illustrations as given.

The matter of getting possession of the objects, and of transporting them to the Institute rooms, was referred to the Secretary with power.

The meeting then adjourned.

Regular monthly meeting at Institute rooms, Dec. 21, 1876. — The Secretary called attention to the fact that the Board of Trustees had been recommended at the late Convention to hold quarterly meetings, and to give sufficient notice thereof to the Trustees who are not residents of New York to enable them to attend if convenient to themselves.

Mr. Haight moved that the next regular monthly meeting of the Board be considered a general meeting, that due notice thereof be sent to all the Trustees, and that the dates for future stated general meetings be referred to that meeting: carried.

MINUTES OF NEW YORK CHAPTER, A. I. A.

A regular business meeting was held at the Chapter rooms on Tuesday, Jan. 2, 1877, at half-past one, P.M.

Mr. Pfeiffer, from the Executive and Education Committees, reported that Mr. Hunt having offered to the Chapter the use of his offices at 28 East Twenty-first Street, for a conversazione and exhibition of the works of members, as well as to provide an accompanying collation, the Executive Committee had gratefully accepted the offer, and appointed the evening of Feb. 22 for the entertainment, which under proper restrictions would be open to the guests of the members.

The occasion would also be improved by the Committee on Education, on behalf of Junior Members, who would previously be invited to enter into a competition of architectural designs, the results of which would form part of the exhibition. The occasion would furthermore serve for the reading of a paper by Mr. Pfeiffer himself on "Light and its Requirements in Connection with Buildings."

The Secretary moved that the reports from the Standing Committees be accepted, and that a vote of thanks be tendered to Mr. Hunt for his liberality: carried unanimously.

Several members suggested that a paper should also be prepared by some distinguished amateur, and read at the conversazione.

The Secretary from the Centennial Committee reported that all the illustrations forwarded to Philadelphia had been handled and returned in good condition.

FIRE-PROOFING THEATRES.

NEW YORK.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — The burning of the Brooklyn Theatre has caused a great deal of discussion as to the best manner of constructing a theatre, to provide for safe egress in the event of fire. Thus far the opinions of managers expressed through the press, assume that the cost of a properly built theatre is too great to make it a good investment; and this view has been generally admitted to be correct. However, I am not of this persuasion, and believe that there remains an economical construction, not of a fire-proof theatre, but of one that shall save the lives and limbs of an audience from fire and panic.

We know that fire in theatres almost invariably originates upon the stage: therefore if we could confine the flames to that part of the building, the only remaining danger is panic. With this view the New York *Herald* very sensibly suggested that the proscenium wall should be of brick, which it seldom or never is in fact, the curtain-opening being a brick archway through this wall. This certainly does not entail great expense. The *Herald* also suggested that there should be an iron curtain to close this opening in case of fire; to this I would suggest an improvement, that the *only* drop-curtain should be an iron coiling shutter which could be decorated as readily as the usual canvas. The constant use of this would insure its always being in readiness in an emergency. The foregoing precautions only deal with the fire as on the stage, and would only serve to delay the consumption of the whole

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building; but the delay would add to the confidence of the audience, and go far toward preventing the horrors of panic. The precautions that I shall propose not only tend in this direction, but make it a matter of no importance if the whole building is in flames before the audience has escaped; for my suggestions are based primarily upon the plan of the corridors and staircases in their relation to the auditorium, and secondarily upon the materials employed and their disposition. The diagram No. 1 shows plan

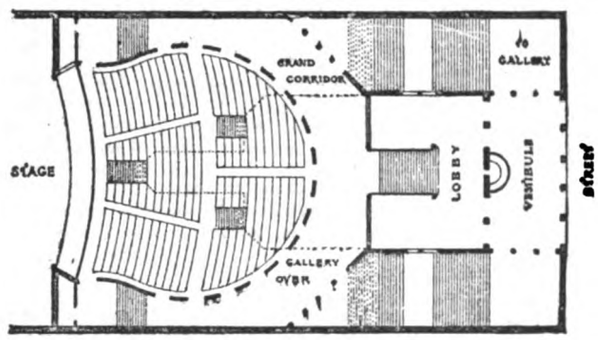


Fig. 1.

of parquette, lobbies, etc. No. 2 shows vertical and longitudinal section. This plan displays an entirely separate exit for galleries and for parquette, — the latter being emptied by three stairways leading to corridors under the floor, the corridors being

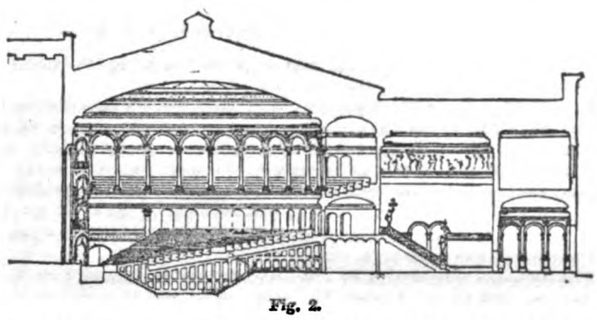
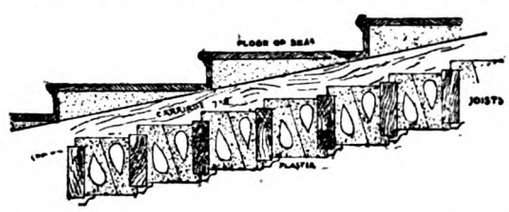


Fig. 2.

much wider than the stairways, and all emptying into the lobby toward the street; these corridors, lobbies, and staircases to be of fire-proof construction in this wise. In this way the ceiling of the passages would be fire-proof, and the walls would of course be



of brick, while under foot we should have concrete. The brick walls would support the joists shown in the diagram, which again support the carriages; the spaces between the joists are filled with self-supporting blocks of fire-proof material, whose flanges cover the edges of the timber, and any interstices are filled up with the same material. In regard to cost, a saving is made in the framing, as with this stiffening no cross-bridging is required, and the timbers can be of smaller scantlings. Exhaustive experiment has proved that wood so protected can endure a much severer exposure than any ordinary conflagration creates, for more than an hour and a half. I have studied this subject of construction in places of public amusement for some years, and find that such precautions as the above would not on the whole add more than ten thousand dollars to the cost of the largest theatre in existence if it were constructed from the first in this way; not only the passages under auditorium, but lobbies and all exits, being on the same principle. Occasions may often arise where the communication with the street is not so direct; but in these instances such precautions as I have described are only the more imperative.

The adoption of these principles would of necessity give our parquettes a much greater pitch than they ordinarily have, and this I think a needed improvement both for acoustic and spectacular reasons.

A. F. OAKEY, *Architect.*

44 WEST SEVENTEENTH STREET, NEW YORK.

ENCAUSTIC TILES. — Encaustic tile works have been started in the outskirts of Pittsburg, Penn.

DRAINAGE IN LEVEL GROUND.

STAMFORD, CONN.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — Mr. Waring's reply in your issue of the 23d ult. to my query printed in a previous number, as to the best mode of disposing of the sewage of country houses which stand on level ground, is interesting, but by no means exhausts the subject.

Of the five systems Mr. Waring enumerates, the first, second, and third are practically excluded from consideration by him on account of their objections, and the fourth (the use of a public sewer) is excluded by the conditions supposed in my query, so that only the fifth (the sub-soil irrigation system of Moule) remains; and to this Mr. Waring nails his colors with the remark that if the grade does not admit of this system it "must be made to conform to it: that is all there is about it." This position I think is hardly tenable, however, for in many places the grade is uncompromisingly and provokingly level, and *cannot* be altered, as, for instance, in such districts as Central New Jersey, where in some towns and villages the grade does not vary twenty inches in the whole place, let alone within the bounds of an ordinary house-lot of say fifty by one hundred and fifty feet. In such cases the sewage *could*, of course, be collected in a tight cesspool, thence pumped into a raised flush-tank, and then discharged into subsoil irrigation pipes; but this plan is too expensive, both in first cost and in operation, to admit of general application, and is moreover open to the objections Mr. Waring makes to tight cesspools. And thus, *for flat grounds*, system number five is also in many cases excluded.

If the question of cost be ignored, there is little difficulty to the engineer in dealing with the problem we are considering, under any conceivable circumstances; but it must be remembered that cost is almost invariably an important if not a controlling element, and the question therefore is, How, at reasonable cost, can we secure the best result?

Now I believe that where, as I have supposed, there is a street water-supply so that we need not fear contamination of drinking-water, the leaching cesspool *properly used* may, notwithstanding its conceded objections, be our best reliance. The conditions under which it may be resorted to, I conceive to be as follows: It should be located as far from the house as possible, but not less than fifty or sixty feet, and should be carried to a depth of at least four or five feet below the mouth of the discharging sewer. Its diameter (as dug) for an ordinary dwelling-house should be at least ten feet; and its walls of large, loosely fitted stones should be "drawn in" from a point just above the sewer outlet as quickly as practicable, so as to form a dome entirely covering the cesspool, above which, to the ground level, the excavation should be filled in with clean earth in which vegetation should be encouraged. Before closing the cesspool two four or six inch pipes of lead or galvanized sheet iron should be laid in place, one reaching down almost to the level of the sewer, and the other starting from the apex of the dome. These pipes should be led below ground to some convenient point, and then carried to an elevation of at least eight or ten feet above ground, and then capped with ventilating cowls, the one leading from the top of the cesspool having a cowl so constructed as to create an upward current in the pipe, the other having a reversed cowl, like a "wind-sail," which will force air downward into the cesspool. By this means we prevent any pressure within the cesspool or sewer from the formation of gases of decomposition, and also provide for a circulation of air within the cesspool which will constantly dilute and carry away the gaseous impurities.

In laying the sewer or drain from the cesspool to the house, the precautions which Mr. Waring suggests should be taken to secure tight joints and a solid bed, a good running trap should be inserted not far from the house, and the iron soil-pipe from within the house carefully connected. Within the house the soil-pipe itself should be independently ventilated by carrying its upper end out through the roof, and making an opening in its lower end in basement to complete the circulation. One or the other of these openings must be connected with the kitchen flue (in which there is always a fire), and the other with the outer air. Thus equipped we have a system which is at least safe against the entrance of "sewer-gas" by the ordinary channels. The existence of any pressure within the soil-pipes and drains is guarded against, and the system of ventilation provides for the constant dilution and removal of gaseous products of decomposition whether produced in the cesspool or soil-pipes.

The remaining sources of danger are from impure "ground-air" and the vitiation of the local water. The latter is admitted as a fact, and the plan under discussion is recommended only where the water-supply is brought from a distant and untainted source. The former only need therefore be considered. Now, assuming a moderately pervious soil at the level of the bottom of the cesspool (and without this the cesspool soon becomes practically a tight one), the purely fluid part of the sewage will probably travel a long way, indeed, will mingle with the subterranean streams which exist in almost all localities. But it should be remembered that all of this sewage is usually enormously diluted with water, that we have provided for the removal of its more volatile constituents, and finally that the liquid portion in flowing away passes

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through what we may regard as a huge filter which washes out and retains the remaining organic constituents. So long as the surrounding soil is able to decompose and absorb the matter thus committed to it, no danger accrues. In the course of time, however, the capacity of the surrounding soil is exhausted; and the gases resulting from the decomposition of organic impurities begin to rise, unpurified and noxious, through the upper strata of the soil. At first the absorbent and disinfectant powers of the latter will disarm the enemy, but ultimately the impure air and gases we have so much cause to dread will reach the surface, and mingle with the outer air. But when this is the case, are we any worse off than under the "subsoil irrigation" system? With that *all* the decomposition occurs at the surface of the ground, and dependence is placed on vegetation and free admixture of air to neutralize its effects. But why are not the same means to be equally relied upon for neutralizing and dispersing the products of decomposition which may occur at a greater depth below the surface? Probably these products are diffused over a much greater area of ground on reaching the surface than they would be under the other system, and are already diluted and partially disarmed for harm. One caution should be observed, however, where this plan is followed, particularly where the cesspool is not well removed from the house; namely, to guard against any possible rising of emanations from the ground *within the house*, by having well-cemented cellar walls and floor (or, better still, in addition to these an open area around the house); but this precaution is one that ought to be observed with any system, and in all houses.

In conclusion let me say that the above plan is only suggested for houses "which stand on level ground," and which have a safe and abundant water-supply. For more favorably situated cases better plans, no doubt, are available; but for the case I have supposed, I have seen none suggested by which at moderate cost equal safety can be secured. But in this correspondence I have been a seeker after knowledge, not an expounder of it; and I shall be glad to learn of better plans than that I have suggested, if such there are.

Respectfully yours,

HENRY R. TOWNE.

THE NEW YORK STATE CAPITOL AT ALBANY.

ALBANY.

TO THE EDITOR OF THE AMERICAN ARCHITECT: —

In spite of the protest from the American Institute of Architects, and the denunciation of the community generally against the unwarrantable alterations being made at our State Capitol, — the exterior especially, — the work still continues.

It is needless to go into a description of the changes: they are pretty well known to our architects as being utterly void of continuity and appropriateness in connection with the work as already executed.

The old work of the Renaissance style terminates squarely under a *Gothic* cornice, which surmounts an entablature with composite capitals without enrichment of any kind; and on top of which begins the new design of a Romanesque species, which we are told is to be very simple and very plain. This *Gothic* cornice is the rim or belt, — the separating line between the two styles and two halves. Any architect can work the thing up in his own eye, and see the absurdity of it. The only affinity between the two designs will be that this new portion is built of granite, and that the window-heads are semicircular.

Much stress has been made on economy, — the costliness of the former design, the cheapness of the latter: projections, balconies, etc., would all be dispensed with, and plain dead work substituted. Well, we are getting the dead work, but it is being well thumped with the stonecutters' mallet and chisel, until we are producing from a stencil, somewhat Alhambric in design, cuttings which cost from fifteen to twenty-five dollars per square foot. This vermiculated work, with the polishing which is to be so beautiful, we fear will be somewhat expensive.

We firmly believe that the old design could have been so modified as to have secured all that was contended for, and at no greater cost than the present one.

But economy is not so important to us as the art status of our country; and taking the design as we find it, and as it promises to be, we are not puzzled to anticipate the criticisms it will incite, and the general condemnation which will follow.

WALTER DICKSON.

BLACK BRICK.

SPRINGFIELD, MASS.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — We notice a correspondent inquires how to make black brick (pressed, we suppose).

Perhaps our experience may be worth relating.

Our brick were Trenton pressed No. 7, and our object was to get them perfectly smooth and lustreless, so that they would bear close inspection; and as the mason did not succeed very well, we tried our hand, and succeeded in the following manner: —

We heated the brick in an oven (not allowing them to come directly to the fire), and found they would stand about a hissing heat without cracking. The tar (of which we used but very little) we put into a pan, and allowed to come to a boil: we then took an old paint-brush, and, after working it up, applied the hot tar to the brick, taking care to scrape the brush so that it held no more than the brick would absorb. This latter we found to be an *important* consideration. By this means we succeeded in getting splendid-looking brick, with as uniform and lustreless a surface as before having the tar applied.

In hopes that this may be of use to your correspondent, we remain.

Yours truly,

FERRY & GARDNER.

ATTEMPTED BRIBERY.

NEW YORK, Jan. 3, 1877.

EDITOR AMERICAN ARCHITECT.

Sir, — I believe the most effective defence against the insult to the profession, proffered by the writer of the enclosed letter, is to publish it. If you agree with me on this point, please do so.

Yours respectfully,

JOHN C. BABCOCK.

27 NEW CHURCH STREET, NEW YORK,
Nov. 27, 1876.

MR. JOHN C. BABCOCK.

Dear Sir, — I would be pleased if you would give me a chance to estimate on any work you may have, and allow an exact half for the profits. You can depend on me as a workman and being able to carry out this plan. Having capital I am able to handle a large as well as a small job.

If this meets your views send me a card, and at your request will call and see you.

Respectfully,

L. H. ROBERTSON.

DAMP ARISING FROM THE BURNING OF GAS.

MR. THOMAS BLASHILL says in the *Builder*, "I believe that gas-lighting as a cause of damp has never been recognized by writers on this subject, though the way in which water will condense in the long chimney or flue of a 'ventilating globe-light' has been noticed. In a paper which I read before the Society of Arts last year ('Health, Comfort, and Cleanliness in the House'), an abstract of which was published in the *Builder*, I gave some hints on this subject. A few particular instances, such as I am now frequently observing, will best show the nature of this evil.

"I was first led to notice it in a mansion which was designed by me a few years ago. When it was on the point of completion, I advised my client to keep up plenty of fires as a means of drying the plaster, and to open the windows on all dry warm days. The price of coals had then risen considerably, while gas remained cheap: so he had temporary burners fitted, and burnt gas night and day. On my next visit I found the plastered walls, which before had been simply moist, covered with a heavy dew; the ceilings were in the same state (but in a less degree), except where they were heated by the gas-flame. The plasterer observed how nicely the walls were 'drying out,' and my client was much pleased. I was as much dissatisfied; for in my experience the water contained in plaster does not dry out in drops, but in the form of insensible moisture which is conveyed away by the atmosphere. As this is a common error, I would point out that whenever new plaster is wet with beads of water, this is due to condensation of moisture from the air on the cold surface of the wall. On several weekly visits I found matters grew steadily worse; but as I had amply protested, and was seeking information on the subject, I was not sorry to watch the experiment. It did not come to an end till I asked my client whether more water had not run down a particular wall, or been wiped off its surface with cloths, than had been put in to make the plaster.

"In the mean time, an equally interesting experiment was going on in the cellar under the dining-room, the floor of the latter being pugged and ceiled below. Communication with the outer air was cut off, and flaring gas-jets were lighted. The moisture that soon began to stand in beads on the ceiling (away from the heat of the gas) soon formed one sheet of water; and then the ceiling became hung with large drops containing half a teaspoonful of water, which fell on the floor till that became wet also. My client, who had full charge of his cellar, insisted with British obstinacy that all this was 'damp' rising from the floor and from an old well. I lived and learned, till one day the late Dr. Letheby kindly gave me the approximate amount of water produced by the combustion of one foot of coal-gas with the needful quantity of air, the hydrogen in the first combining with the oxygen in the atmosphere. In that house five hundred feet of gas were being burnt per day, and I calculated that during the 'experiment' not less than a hogshead of water had been produced. Any one may satisfy himself as to this by observing the phenomenon which first gave me the hint as to this cause of damp. Light an argand gas-burner fitted with a clear glass chimney: in the first moment a flush of moisture, like condensed breath, will appear in the chimney; the next moment it will disappear, being vaporized by the heat of the flame. But the moisture continues to be produced,

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and will go about the room (or even about the house), searching for any damp corner or cold wall where it may settle. There is also moisture produced by the burning of oil-lamps, but to a much less extent. I have had complaints of 'damp' which affected the clothes hung up in mahogany wardrobes, and which could be traced to nothing but the excessive consumption of gas which many people practise to save trouble, — lighting up every burner at nightfall, and thus keeping the whole house light and warm. I have just had to report upon the damp which is destroying the paper in the handsome drawing-room of a well-built house where, after observing that these walls were the only walls in the house that exhibited signs of moisture, I found it was the practice to light up a large chandelier early in the evening, the door being usually closed, and no fire kept up as a general rule. From the same cause a friend had his drawing-room thoroughly drenched with water one very cold Christmas, the gas having been kept burning night and day in the closed room during the absence of the family.

"With regard to public buildings, I have just been in a church that I have recently completed, and found the windows covered with water, and the walls patchy with moisture, through the gas having been burnt for a whole day in order to warm the building for Wednesday evening service, every means of ventilation being at the same time closed. This is a constant habit in many churches where choir practice or short services are frequent, and is highly objectionable.

"One other instance is instructive as showing the effect of different ways of 'finishing' wall-surfaces. I sometimes attend concerts in a building which is two or three years old. The walls of the room are designed with pilasters, which were finished in polished Parian cement, the panels between them being in ordinary plaster. When first used the room was unpainted, and the moisture from breath and from the gas condensed on the smooth pilasters only. The whole wall-surface has been lately painted; and now, when the ventilation is inadequate, the moisture condenses pretty equally all over the wall.

"The remedy is, first, to burn as little gas as possible, and next to apply all the means of ventilation I have noticed, particularly such as keep up a supply of warm fresh air and a draught of spent air towards the fire. Polished surfaces should also, where possible, be avoided.

"Without questioning that in many instances the dampness of a house is rightly attributed to the driving of rain against the walls, I am satisfied that it usually arises from one of the causes here indicated. I believe that frequently where the ties used in hollow walls seem to transmit the damp so that one may count them by the wet spots on the paper hanging, the real cause of the damp is that the ties have simply carried off the heat from the inner face, and so facilitated the condensation of the internal moisture of the house on these particular spots. I am sure, however, that the subject urgently requires attention, and ought to be better understood by persons who are responsible in any way for the condition of houses and public buildings."

NOTES AND CLIPPINGS.

BROOKLYN'S MUNICIPAL BUILDING. — After a twelvemonth of talk, work on the Brooklyn Municipal Building is just begun. The project grew out of the necessity of bringing the scattered offices of the various city officials under one roof; and in February last an appropriation of $2.0,000, exclusive of the cost of the land, was voted for the purpose. The foundations of the building are laid on the lot on Joralemon Street, directly west of and adjoining the court-house. It will be 100 by 150 feet, four stories high, of brick with marble front, and practically fire-proof. The architecture is of the French Renaissance style, with little decoration. [Whose is it?]

THE ANNUAL FIRE RECORD OF NEW YORK. — During the past year there have been 1,344 fires, causing a loss of $2,717,906, while insurance amounted to $11,923,109. The assigned causes of these fires are as follows: carelessness of occupants, 321; children playing with matches, 65; broken glass falling on matches, 1; vermin gnawing matches, 6; defective flues, 41; foul chimneys, 130; hot coals dropped from stoves, 3; sparks from chimneys, 43; upsetting stove, 7; overheated stoves, 40; improper management of stove-pipes, 9; improper construction of brick furnaces, 3; furnaces and chimneys, 13; ignition of escaped gas, 22; gasoline stoves and lamps, 3; kerosene lamps, 86; explosion of liquid gas, 2; clothes igniting from stove, 7; window-curtains, clothes, etc., ignited by gas-lights, 51; fat and meat falling into the fire, 18; tar and pitch boiling over, 35; sugar and wax boiling over, 4; hot rye in cooler, 2; friction of belting and machinery, 6; oily rags in contact with steam-pipes, 1; spontaneous combustion, 23; chemicals igniting, 2; fireworks, transparencies, etc., 106; sparks from previous fire, 7; bursting of kiln, 1; Christmas tree, 1; accidental, 12; incendiary, 18; malicious mischief, 28; unknown, 85. The account from which this is compiled still leaves the causes of 145 fires unexplained. These fires were attended by fifteen fatal casualties.

ARTESIAN WELL. — Artesian water has been struck in the Foot-Hills of California. A farmer sunk a well, expecting water from the usual alkaline surface springs; but instead he struck a spring of artesian water that rose from the bottom at forty-five feet below to twenty feet above the surface of the ground.

PROMPT ACTION. — The proscenium of the Boston Museum has been made fire-proof; a new main entrance to the auditorium is being constructed; the new wire curtain is ready, and will soon be put in place; and the sprinklers, which are capable of deluging the entire stage with water in a few seconds, will be made available as soon as a supply is furnished from the high service main. The hose attachments on the stage are, as they ever have been, extensive and complete, and available at all times for immediate use.

AN OVERBURDENED ROOF. — On Tuesday morning, Jan. 2, a large portion of the truss roof of the carriage-house of Garcelon's stable on the corner of Chestnut and Brimmer Streets, Boston, upon which had accumulated a large quantity of snow fell, burying a large number of carriages belonging to private parties. Some twenty-five first-class buggies and sleighs were ruined. The loss on the building, which was formerly used as a riding-school, falls upon the owner, Jonas Fitch, and, with the loss on the carriages, amounts to upward of $10,000.

THE NEW CAPITOL AT ALBANY. — The Albany *Argus* of the 1st inst. says: "A meeting of the new Capitol Commissioners was held last week, and advertisements were ordered for iron work, masonry, granite, tiling, plastering, etc., sufficient to continue the work through the winter, and to carry the building forward well into the fourth story. The report required of the commission by the legislature of last year in relation to the detailed plans and specifications will be ready at an early day, and says the building will probably be ready for roofing next year if a new appropriation is made early in the session. To have the building fully habitable by 1879, it will be necessary, however, to have liberal appropriations in the mean time."

SCHOOL HYGIENE. — The New York Medico-Legal Society has adopted the following recommendations: the minimum age of admission to public schools should be six years instead of four; the maximum attendance at school for children under eight years of age should be made three hours per day, with suitable intermission; provision should be made by law for medical inspection and supervision of schools to secure the enforcement of sanitary laws; large playgrounds should be furnished for the children, and the schools should be built where adequate space can be had to insure light, ventilation, and play-ground.

HARD TIMES IN BOSTON. — The building-permits issued in 1874, 1875, and 1876, are given below; and from the table it will be seen how great has been the falling off in the permits issued. It does not, of course, show the number of buildings erected, as a single permit may represent one or six buildings.

	1874.	1875.	1876.
Brick and stone	345	224	151
Wood	911	563	454
Repairs and alterations	1887	1627	1778

OVERCROWDING OF TENEMENT-HOUSES. — The New York *Times* estimates the population of the Eleventh Ward, New York, where a large part of the German population live, at about 196,510 per square mile; that of the Tenth Ward at 185,512; that of the Seventeenth Ward at 153,006; while in a portion of the Fourth Ward there are about 17,600 packed upon an area of some thirty acres, raising the rate to about 200,000 per square mile. Holborn, one of the poorest of the London districts, has a population of about 148,705, while East London, a still more wretched district, has a population of about 175,816, to the square mile.

PANIC IN A CHURCH. — On Sunday night, Dec. 24, a disaster came near taking place in the St. Mary's Catholic Church at Oshkosh, Wis. The light drapery with which the altar was trimmed caught fire, which filled the church with flame and smoke in an instant. The large audience became panic-stricken, and made a rush for the door, which at the time was closed; and, the excited people crowding and jamming against the door, it was utterly impossible to get it open. The flames were quickly extinguished before much damage was done, and the congregation quieted.

FIRES AT CHICAGO. — During the past year there have been 474 fires at Chicago, causing a loss of $330,820, while the insurance was $3,272,800.

THE NEW YORK THEATRES. — It is stated that two picked firemen have been assigned to each theatre, one of whom is to keep watch in the auditorium, and another is to have charge of the fire-apparatus in the house.

THE PHILADELPHIA PUBLIC BUILDINGS. — The Supreme Court took possession of its new rooms in the Public Buildings on the 1st inst.

PANIC AT AN ENGLISH THEATRE. — A false alarm of fire at the Prince's Theatre, Manchester, England, created a momentary panic on Dec. 16.

THE HÔTEL DIEU, PARIS. — A new Hôtel Dieu is rapidly approaching completion, and is described as having an appearance of massiveness rather than of elegance; terraced walks are laid out in the principal court-yard of the main building for the use of convalescents. The old hospital will be torn down as soon as the new one is ready for occupancy, and thus make the Cathedral of Paris more conspicuous.

AN APPROPRIATE TITLE. — An exchange gives as title of an illustration of the Tuscan column made of grindstones at the Centennial, "A Monument to Grit."

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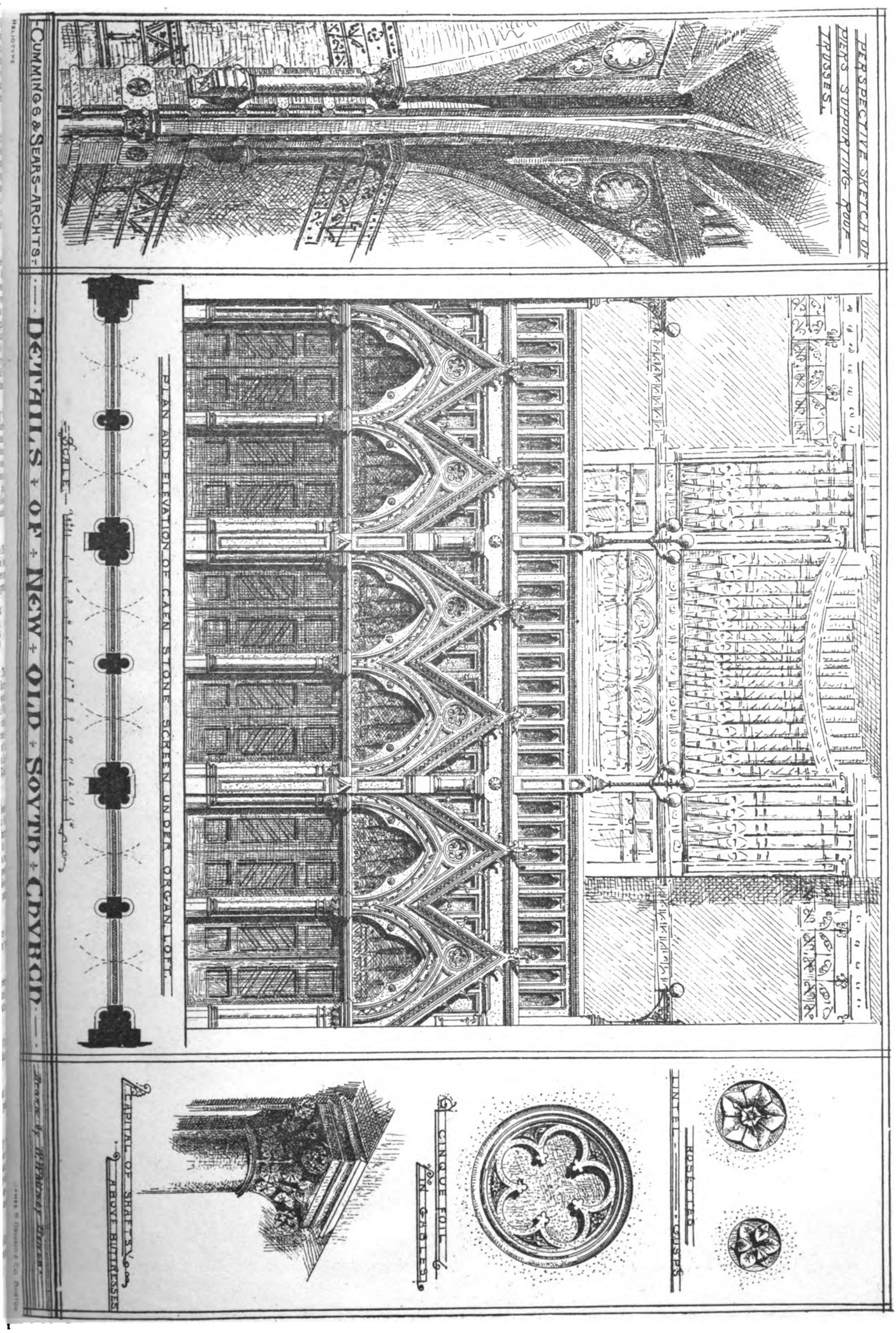
Cummings & Sears-Archts.
Details of New Old South Church
Perspective Sketch of Piers Supporting Roof Trusses.
Plan and Elevation of Caen Stone Screen under Organ Loft.
Scale
Capital of Shafts above Buttresses
Cinque Foil in Gables
Tinfel Cusps
Rosettes

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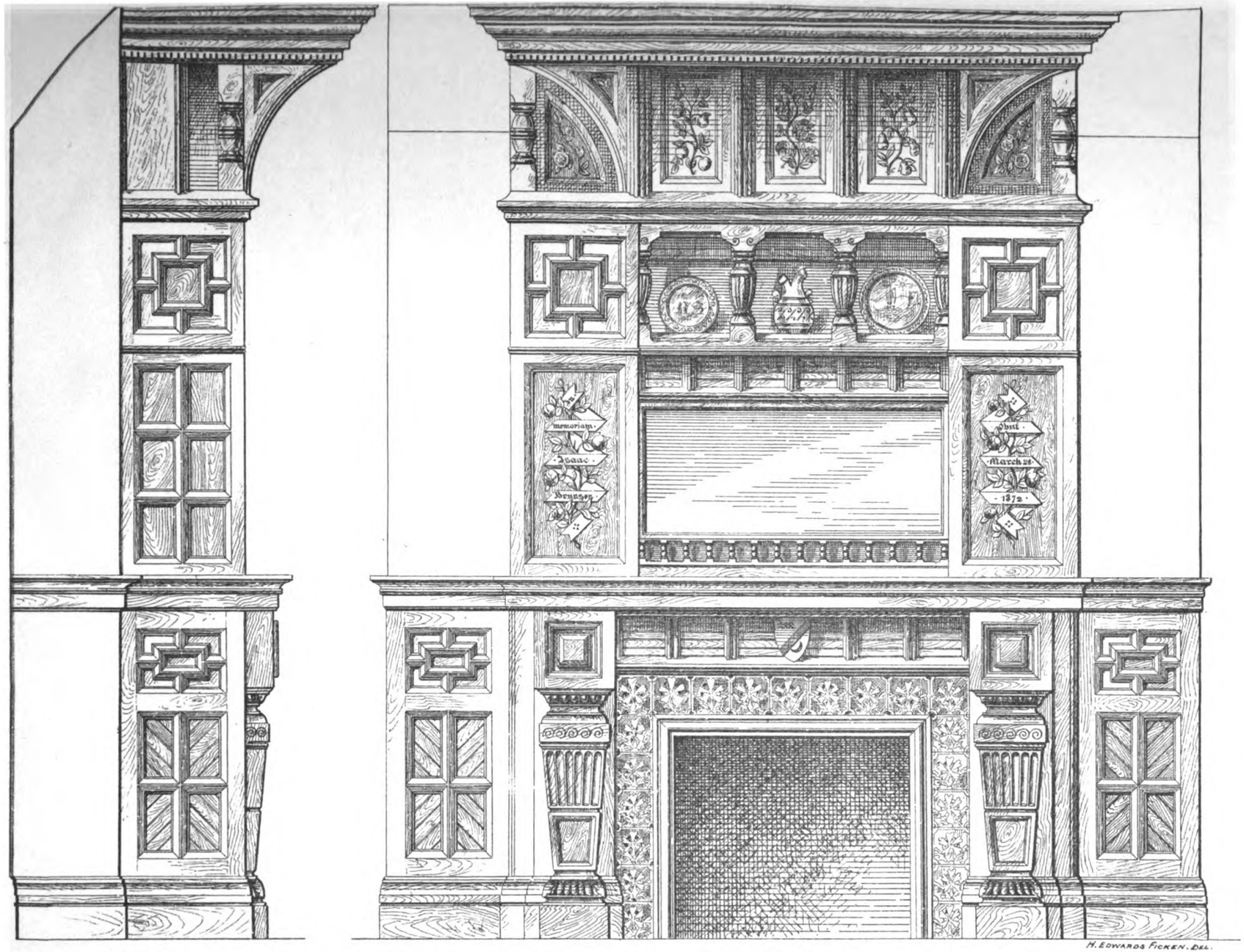
· Kappa Alpha Lodge · Design for Memorial Fireplace ·



· Side ·

· Front ·

H. EDWARDS FICKEN, DEL.

HELIOTYPE

· Potter & Robertson Architects ·

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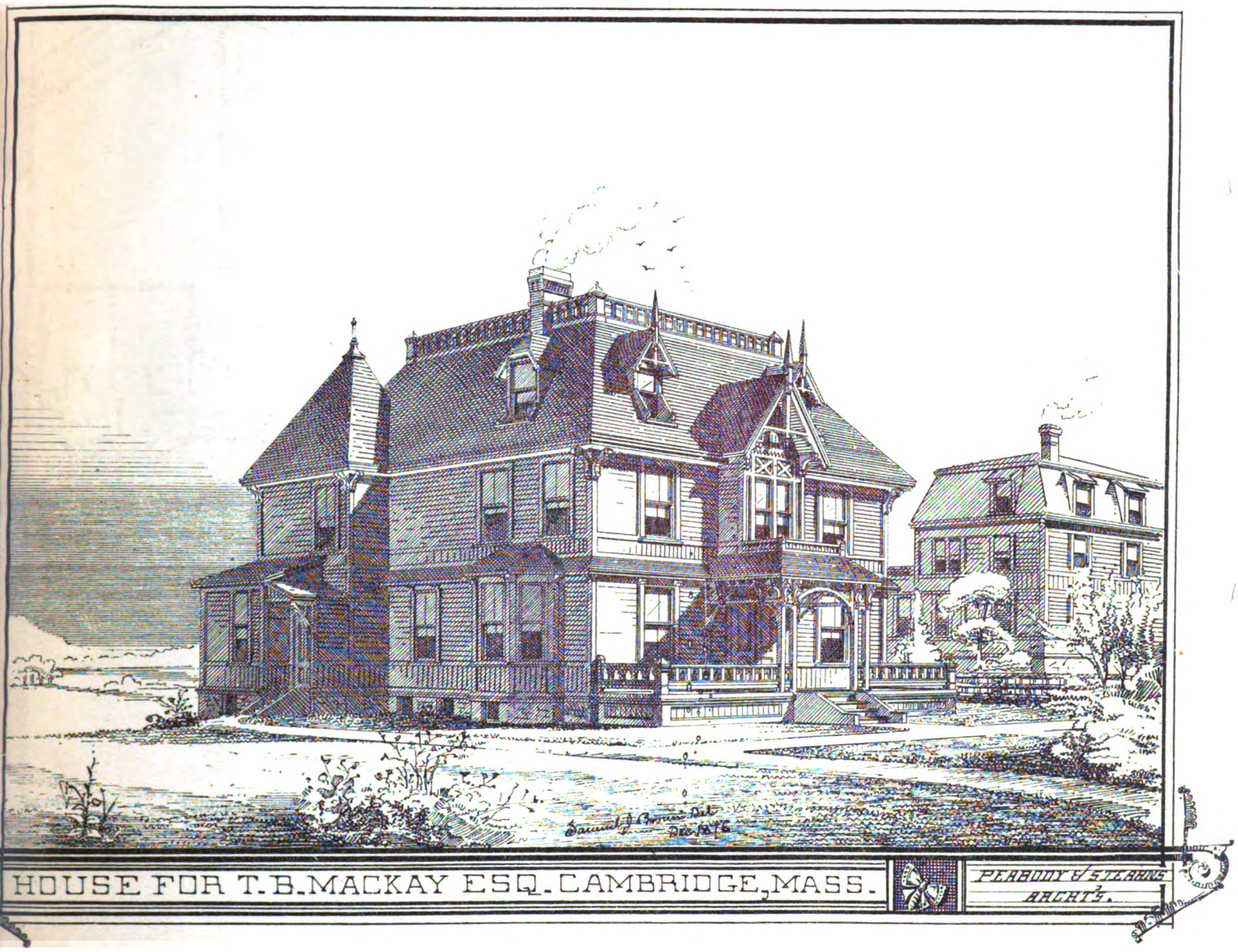
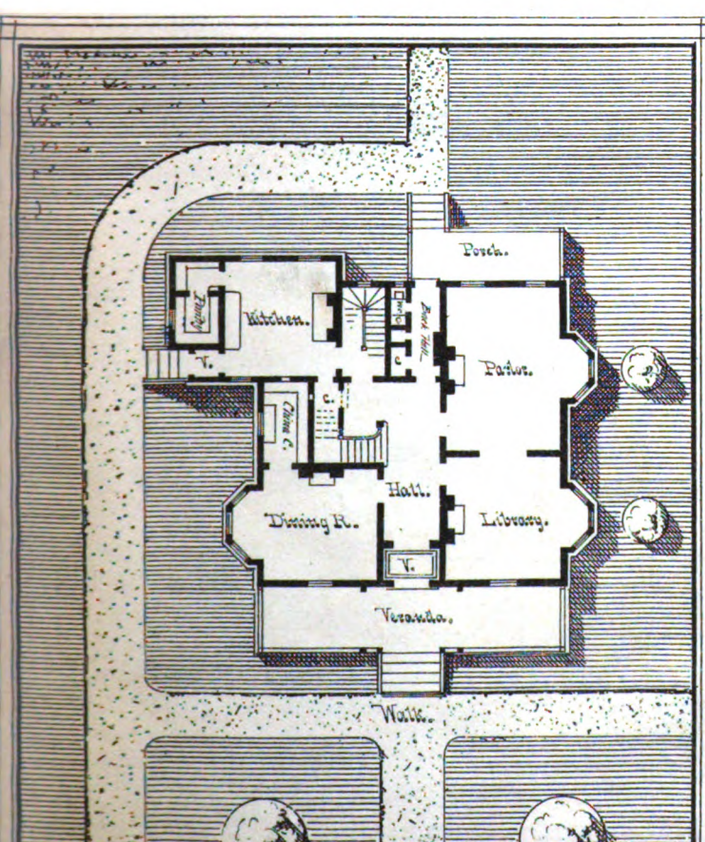
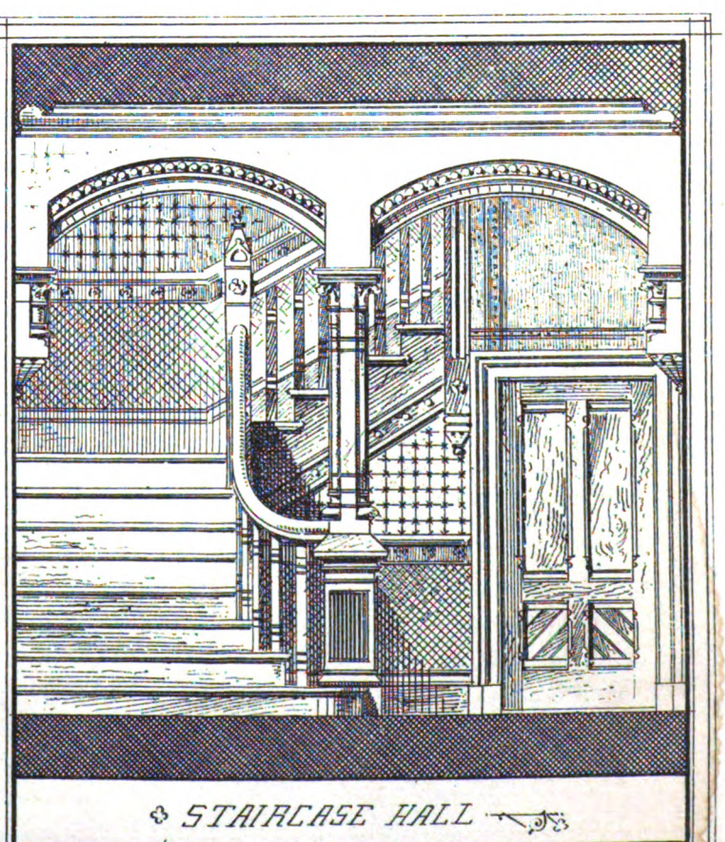


HOUSE FOR T. B. MACKAY ESQ. CAMBRIDGE, MASS.

PEABODY & STEARNS ARCH'TS.



PLAN



STAIRCASE HALL

ELEVATION

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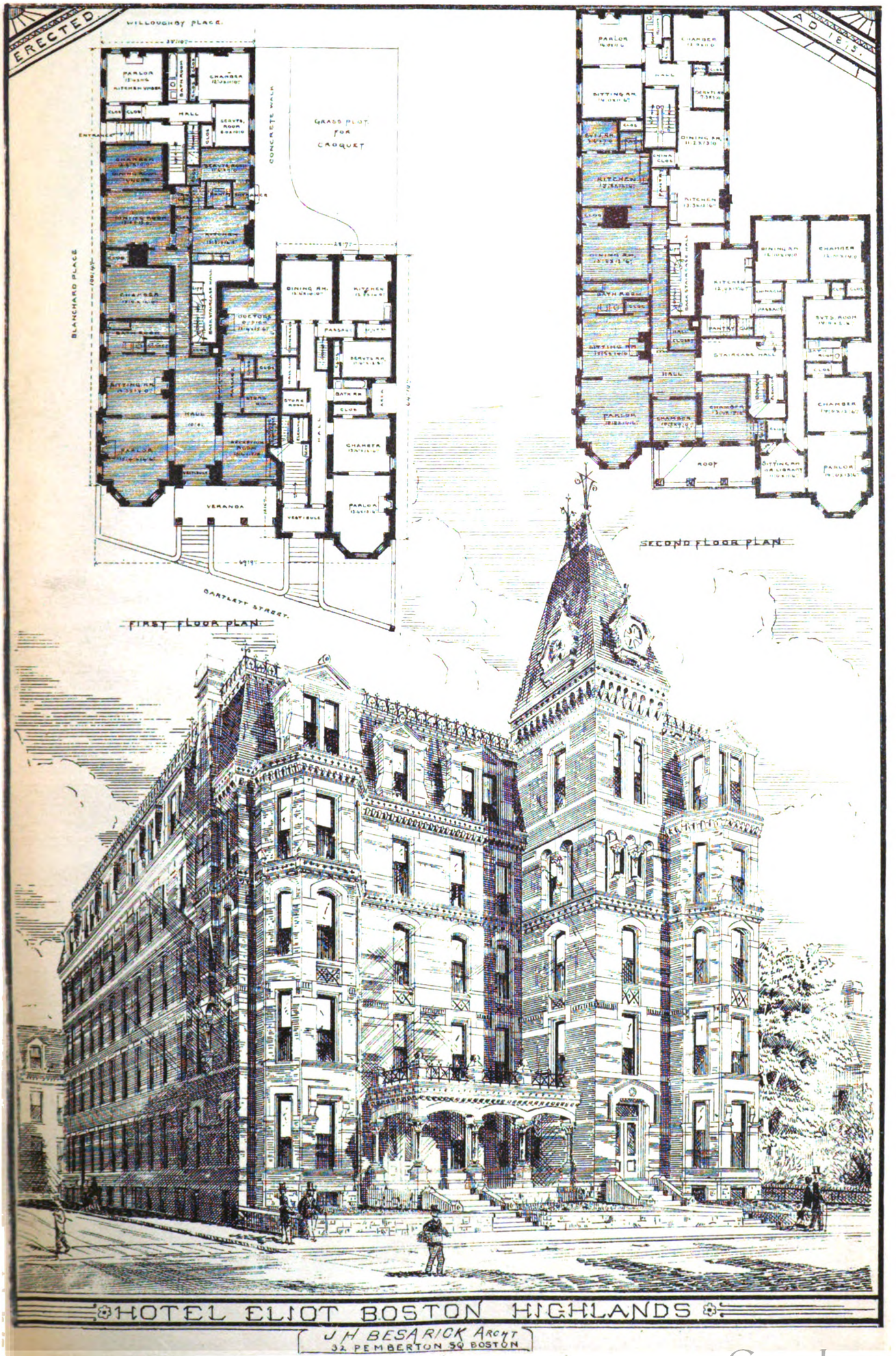

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, JANUARY 20, 1877.

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IN the testimony before the coroner's jury on the Ashtabula accident, Mr. Tomlinson, who made the drawings for the bridge, testified that the bridge was not built as he had designed it. He objected to the form of bridge used, the Howe truss, for a long span, as being unnecessarily heavy, and one in which the strains accumulate in the end braces (we cannot think of any form of truss girder of which this last might not be said). He however designed a truss which he considered amply strong, but proposed heavier braces than were actually used; and in consequence of a disagreement on this point with Mr. Stone, then president of the road, in which he was overruled, Mr. Tomlinson resigned his position as constructor. There is nothing known yet, so far as we learn, to indicate that the bridge gave way at the end braces, where Mr. Tomlinson thought it was weak; but in fact there is nothing to show how it did give way, and only a very careful examination by capable engineers is likely to show it. The bridge consisted of two Howe trusses with a span of one hundred and fifty feet, in panels eleven feet long and twenty-two high, so that it was of safe proportion; and it was commonly considered very secure. It had guard rails to prevent danger from the train leaving the track; and the floor, which rested on the upper chord, was of ties set only two inches apart. There is no special reason to believe that the train did leave the rails.

OF course, while there is no evidence, there are many conjectures why the bridge fell. Col. Carrington, U.S.A., has written to the New York *Tribune* to suggest two frequent causes of danger, — the gradual unscrewing of the nuts that secure the ends of the bolts in a truss, and the gradual crystallization that wrought iron is believed to undergo under continued vibration, and perhaps under ordinary conditions, which changes its condition into very nearly that of cast iron. The first danger is one that could be pretty well guarded against by careful inspection, though it might occur suddenly. The second has been the subject of vehement dispute; and even now there are many engineers who refuse to believe in its existence. Nevertheless we think the evidence that it does occur is too strong to be resisted, and has on the whole been accepted. A case is cited by Col. Carrington where the president of a Western railroad, examining a Howe-truss bridge which had broken, found that the suspension rods not only showed a crystalline fracture, which might possibly be misleading, but were more brittle under the hammer than samples of ordinary cast iron. Similar molecular changes seem to occur even in cast iron, where in some cases at least they increase instead of diminishing its strength, apparently by lessening internal tension. This was indicated by some experiments with ordnance, reported to the United States Government by Major Wade, in which a series of similar guns were tested by repeated firing in successive years; and it was found that those that were not fired till they were a year or two old endured many more charges than those that were fired when they were new. There is also the action of a very low temperature, which no doubt may be aggravated by rapid changes, and which unquestionably makes iron more or less "short" or brittle. It is uncertain how large factors these changes are, but it cannot be safe to disregard them. They are changes which, though they may not have much effect on the resistance of the metal to compressive strain, will modify its resistance to tension and still more to impact; and the effect of a quick train on a bridge is a combination of stress, vibration, and impact, than which few things could be more trying. To this we may add that while the expansion of metal at a warm temperature will relax the parts of a complicated framing, and allow a slight settlement, the shrinkage from cold is likely to bring them back, not exactly to their old bearings, but into a state of exaggerated tension. The repetitions of this process may be in the long run a source of considerable danger. With all these uncertain elements to contend with, and with only a few years' duration of our oldest iron structures, we must regard iron as a material whose behavior in such extremely trying positions is still uncertain, or with which we at least are not yet fully acquainted. The *Iron Age* says, "We know there are plenty of cheap, badly built bridges, which the engineers are watching with anxious fears, and which to all appearance only stand by the grace of God. When these fail we are not surprised; but when a bridge like that at Ashtabula falls under the weight of two engines and, at most, two cars, after several years service under a heavy freight and passenger traffic, we realize how much we have still to learn of the art of bridge-building."

IN the mean time our only resource is in investigation and inspection. It is to be hoped that the inquiry into the Ashtabula disaster, which has been undertaken by the civil authorities, will be made as searching as it is possible to make it. Since the problem involved is a very interesting one to engineers as well as to the public, we may hope that it will be thoroughly studied. For security in future there is not much pledge, but in some careful system of state inspection. Mr. C. F. Adams, jun., Railroad Commissioner for Massachusetts, has written an open letter to Gen. Garfield, who is the representative of the Ashtabula district, in which he urges the importance of some government oversight in railroad matters; arguing that the supervision of them is a duty that the States cannot fulfil, since they concern commerce between the States. He recommends the establishment by act of Congress of a Bureau of Railroad Statistics as a part of the Department of the Interior. The bureau should, he says, include a statistician and a railroad engineer. "The first should collect and put in shape for reference the vast amount of information connected with the interior commerce of the country, which is now practically inaccessible. The last should make a study of all railroad accidents, and himself specially investigate those which present unusual features, or the cause of which is difficult of ascertainment. The public would then know what the railroad companies are now under the strongest inducement to keep to themselves." That is to say, it would know how many accidents occurred, and to what injury, and what their causes were, so that a wholesome pressure would be brought to bear on the companies, and experience of extreme value be gathered up and recorded for the use of the community. No doubt such a bureau would serve an excellent purpose: at the same time it would hardly be sufficient for the need. It is essential to have not only an examination of accidents that have happened, but warning of those that are likely to happen, and defence against them. This would require a constant system of inspection of all bridges, and other works which may be perilous, throughout the country. It would call for a large force of inspectors, and could, we should suppose, be accomplished better by the States than by the General Government. It is a large undertaking to see that all the bridges and stations that are built are secure, all tracks and embankments and tunnels and cuttings in good order; but the multiplication of travel has made the railroad system of enormous importance, and whatever objections there may be to State interference with their tariff, the companies to which the franchise is given should be compelled to use it with safety to their passengers.

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THE question of the authorship of the design of the Sinton Forum, which has been the subject of a considerable dispute in the Cincinnati papers, is not of public interest; but it raises certain questions whose interest is general, and which are constantly recurring in one way or another. In the present case it appears that Mr. Sinton, wiser than many of his contemporaries, having it in mind to build a monument which would include both architecture and sculpture, consulted with an architect, Mr. McLaughlin, and with a sculptor, Mr. Ezekiel, although he did not realize the desirability of consulting with both together. Each artist prepared a number of sketches; and Mr. Sinton, after having agreed to pay Mr. Ezekiel for the right to use any of his drawings or ideas, fixed upon a design prepared for him by Mr. McLaughlin. Mr. Sinton probably had some ideas of his own as to what he would like to do, and communicated them to both artists. The sculptor, having seen the published design, has accused the architect of stealing it from his (the sculptor's) sketches, which the architect utterly denies. Both the artists doubtless believe themselves to be in the right. Without going into the controversy, it is enough to say that, so far as we can judge from what we read, it would appear that the architect is so.

THE question of general interest which this suggests is, What constitutes property in a design? And we may point out one cause of common misapprehension. In an age which inherits all its notions of design, especially in one so wholly eclectic as ours, it is not worth while to expect much originality. The motives and ideas from which designs are made up are a common stock from which everybody draws; and if one man has worked out some combination for himself that he thinks to be new, it is likely that some other, better informed, will be able to point him to a precedent. The original contributions of the designer are commonly limited to some variations in detail or arrangement, often to some refinements which the common observer does not see at all; and only an expert examiner can decide how much is to be ascribed to the individual, and what belongs to the common stock. The inexpert critic will be likely to ascribe any form that is new to him to the artist in whose work he first finds it, and when he meets it in a subsequent work, to accuse the second artist of having stolen it from the first, not recognizing it as part of the universal heritage. So a man of little acquirement, when he appropriates or re-invents some small device, is very hard to persuade that it does not belong to him alone. It is very common for a man, venturing into an unfamiliar domain, to seize with complacency upon some obvious commonplace, holding it tenaciously as his own, and bring fierce charges of piracy against the accomplished practitioner who, regarding it as an every-day appliance, used it without question when it suited his purpose. We have seen a carpenter, in the days of the French-roof *rabbia*, who had mentioned to an architect his liking for a straight Mansard with a curve at the bottom, seriously propose to charge that architect a commission on the idea when he discovered it in one of his designs. When we take into the account the difficulty which an untrained critic has in distinguishing not merely the old from the new, but the essential from the subordinate, and his liability to fix upon what is most immediately conspicuous, and pass over that in which the real character and study of the thing before him reside, we cannot have great confidence in inexpert criticism. One often hears two musical compositions accused of similarity because of their common use of some simple and obvious melodic motive, when their idea, development, and structure are essentially different; and so one hears buildings likened to each other on account of some similarity of motive, when they are as different in character as two buildings designed in the same style and for the same purpose can be expected to be. This is one of the things that have to be borne. If there is a remedy for it in architecture, it would seem to be in the progress of general education, by having architects persist in some one style of work till the community is trained into discrimination of it.

COMMUNICATIONS which are addressed only to the editor in person do not come to the office of the paper, and are liable to be delayed or mislaid.

DR. SCHLIEMANN has given in two recent letters to the London *Times* surprising accounts of his last discoveries among the tombs of Mycenæ. He first mentions finding in one tomb remains of three bodies, and with each of them were five golden diadems each nineteen inches long and four and a half broad, tapering to the ends; but these were trifles to what came after. In another tomb he found the bodies of three women absolutely buried in jewels; and making another excavation in the ring of tombs which he has before described, he found a tomb eighteen by twenty-four feet, whose bottom was thirty-three feet below the surface of the ground, and sunk several feet into the underlying rock. In the centre of this tomb rose a structure of cyclopean masonry, oval in plan, seven feet across, and four feet high, and enclosing an open well. This he took to be a funereal altar; and he was strengthened in his conclusion by finding at the base of it a short column and two slabs of stone, which he thinks are tombstones. The excavation in the rock was lined on all sides by rubble walls four feet thick and seven and a half high, laid in clay and battered. A layer of pebbles was spread on the floor of the tomb. On this lay the remains of five men, three with their heads to the east and two to the north. It was evident from the position of the ashes, and the marks of fire on the pebbles and the ornaments about them, that these bodies and those in the other tomb had been burned where they lay. They were covered with a layer of three or four inches of clay, and that again with pebble-stones.

DR. SCHLIEMANN'S story of the treasures which he found heaped about the bodies in these last two tombs reads like an extract from the Arabian Nights, or the story of Miss Kilmansegg. Where the three women lay, he found no less than twenty-three crowns and diadems of gold, one of enormous size and composed of large leaves, being two feet long and eleven inches broad; six richly ornamented vases and goblets of gold of various sizes; and golden ornaments almost without number, including ear-rings, brooches, flowers, crosses, wheels, ornaments in the form of lions, stags, swans, pigeons, and even women and houses; and all were wrought with the utmost richness and delicacy of ornament, principally in spirals and circles. With these were sceptres of silver tipped with balls of crystal, a silver vase, and some engraved gems and vessels of bronze. But even this magnificence was outdone by what was found in the tomb of the five men. Here were a golden helmet, unfortunately crushed out of shape; eight golden diadems; a golden bracelet weighing nearly eleven ounces; a golden vase weighing four pounds; three smaller ones richly decorated, and six goblets; a heavy breastplate twenty inches long and twelve wide; three large breastpins from three to five inches wide; two shoulder-belts and three girdles; and rings, sword-hilts, and other ornaments, still all of gold; and more than two hundred gold buttons of two inches diameter and less. Perhaps the most singular things in the collection were golden masks which covered three of the faces, and which Dr. Schliemann believes were portrait masks. Of these he says, "Each mask shows so widely different a physiognomy from the others, and so altogether different from the ideal types of the statues of gods and heroes, that there can be no doubt that every one of them faithfully represents the likeness of the deceased hero whose face it covered. Were it not so, all the masks would show the very same ideal type. One of the masks shows a small mouth, a long nose, large eyes, and a large head; another a very large mouth, nose, and head; the third a small head, mouth, and nose." To these are to be added bronze vessels, two dozen bronze swords, and many lances, with remnants of wooden scabbards and hilts ornamented with gold, and a bronze cow's-head plated with silver and adorned with gold, which Dr. Schliemann takes to represent the patron goddess Hera. There were also in the women's tomb four small bronze boxes filled with blocks of wood which had been fastened into them with bronze nails, and were charred by the fire. When one thinks what wealth must have been left to the survivors of these men, that they should be willing to burn such treasures with their dead, he is dazed with admiration at their splendor; and he is struck with almost equal wonder that Dr. Schliemann, having found the treasures, should dare proclaim them till he is safely home with them.

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FREEMAN'S HISTORICAL AND ARCHITECTURAL SKETCHES.[1]

WE owe a new debt of thanks to Mr. Freeman for this his last contribution to the literature of architecture. The author's architectural essays in the *Saturday Review* and the *Pall Mall Gazette* are well known; but, as here collected and arranged, they form a connected series of studies and obtain a new value. They relate mainly to the monuments of the later Roman empire, and to the earliest developments of Romanesque art. Mr. Freeman's point of view is essentially that of the antiquary; but the wide range of his general historical knowledge, and his freedom from the bias of the theorist, enable him to treat his subject with a breadth and an independence of thought which are very imposing to the professional reader, and extort from him the confession that in the hands of this writer at least, literature may justly treat an architectural theme. Those who expect to find in these essays the usual promptness of the layman to generalize from insufficient premises, or to consider art a bundle of dogmas, will be disappointed. The study of Christian architecture, as approached from the historical side, throws such new light upon the phenomena of its development, that the natural distrust of the architect is disarmed; he finds himself led by new paths to conclusions familiar and unfamiliar. Indeed, of all general historians, Mr. Freeman seems to be the only one who has given to the monuments of architecture their due weight as evidences of history. This, perhaps, will give him his especial place in the literature of the times.

The text of these essays may perhaps be found in the following proposition: —

"Next to the introduction of the arch itself, the greatest invention in the whole history of architecture was the improvement by which the architect of Diocletian's palace at Spálato ventured to make an arch spring at once from the capitals of a pair of columns." (p. 18.)

This feature he considers the germ from which sprang all subsequent arched architecture, whether Romanesque, Saracenic, or Gothic.

"To one who recognizes the continuity of history, and therein the continuity of architecture, to one who does not dream that there was any time when the building-art perished from the earth, the works of classic Rome are in all things only a transition to the more perfect works of Pisa and Durham. The age of Diocletian, the age which reared the court of Spálato, though its bricks may be wider apart than bricks were in the golden age of Nero, is seen to be the age of the greatest architectural development the world ever saw." (p. 216.)

Mr. Freeman enters Italy, to which region these studies are mostly confined, by way of Würzburg, Munich, Innsbrück, and Trent; observing as he advances southward, the increasing influence of Italian art upon the Romanesque remains of these cities, and recalling the resemblances and modifications to which the style submitted in the remoter parts of Germany and in England, and which illustrate the corresponding parallelisms and variations in their historical conditions. But, —

"The more German and Italian buildings the antiquary examines, the more carefully he compares them with the little which is left in England of the eleventh century and of earlier date, the more fully does he become convinced of the essential unity of the early Romanesque in all three countries."

While next observing the ecclesiastical buildings of Verona, and the secular buildings of Venice, he notes that these Romanesque characteristics never died out in Italy as they did at the North, but enjoyed the advantage of a consecutive development alongside of Italian civilization as it progressed even into the era of the Renaissance. San Zenone of Verona he regards as the noblest type of what he calls the barbaric form of Italian Romanesque, as compared with its more refined development in Pisa and Lucca. The later Pagan remains in its neighborhood, the gateway-arches and amphitheatre, together with the more famous *Porta Nigra* of Trèves, are treated as antitypes of Spálato, serving to connect the two great eras of history, explaining and foreshadowing certain details of the Christian builders, not only at Verona, but in distant Waltham, Durham, Dunfermline, and Lindisfarne. The glories of Ravenna, the one spot in the world in which remain untouched the monuments of the almost-forgotten era between heathen Rome and mediæval Christendom, are made to have a new significance by the abundance of historical illustration and by the wide geographical range of contrasts which are the peculiar features of Mr. Freeman's archæology. The same may be said of his sketches of the imperial residences at Trèves, Aachen, and Gelnhausen, which are models of archæological study. In treating of Lucca, the attention of the architect is attracted by the observation that its builders, like those at Ravenna, adhered to the classic models, but, unlike the latter, their loyalty was proved by their strange resistance to the temptations of the new mediæval forms which had grown up in their neighborhood. This, our author infers, was not because they were ignorant of them, but because they despised them. This looks very like a phenomenon in the history of architectural development.

But to the architectural student in especial, "all roads lead to Rome." In this division of his subject, Mr. Freeman treats successively of "The Walls of Rome," "Tusculum," "Basilican Churches," "The Great Roman Basilicas," "The Lesser Churches of Rome," and "Mons Sacer." Here as elsewhere in these sketches, the essential relations between late Pagan and early Christian history, as illustrated by the monuments, are analyzed with the discrimination of a scholar and the feeling of an artist. We would draw especial attention to his chapter on the development of the basilican churches from the classic types; and the comparative view of the Roman basilicas has many points of originality. We can sympathize with his archæological rage against the zeal of the Renaissance popes and popes' nephews in destroying or disguising so many precious monuments of antiquity, which might have served as links in the chain of the gradual development of style. "Why," he cries, "did the popes not stay at Avignon, where there was less to spoil? Why did they come back to Rome on their errand of havoc and disfigurement?"

Among the points of original observation to be noted in this book, we have only space to quote, as an example also of our author's historical style, the picturesque story of the Church of St. Andrew at Vercelli: —

"In the later days of John and the earlier days of Henry the Third, the Legate Walo or Gualo fills a prominent place in English history. . . . He appears throughout as one of those papal emissaries who went so far towards becoming the actual rulers of England during the minority of Henry; and, as became a papal emissary, he appears also as a merciless plunderer of the clergy and nation of England. The fruits of his plunder we see in one of the stateliest piles in Italy, the only one which would not seem out of place on Northern ground. Out of the spoils of England, Walo reared the half English-looking, hardly at all Italian-looking, minster of St. Andrew. . . . It might be argued that the inside of St. Andrew's is not so much English as French. It is of course neither purely English nor purely French; but the style which it exhibits is that form of the early Gothic . . . which is common to France with a part of England. It will not remind any one of Ely or Salisbury or Beverly; but it ought to remind any one who has seen them of Wells and Glastonbury and Llandaff. And yet, in the mere shape of the clustered columns, Vercelli really comes nearer to Ely than to Wells, while the mouldings are less advanced than they would be in any English or even French church of the date. But the capitals would seem quite in place in the great churches of the West of England and in many French churches too. The proportions are quite northern; there are no sprawling Italian pier-arches here."

In short, this book is eminently worth reading and digesting. But we cannot leave it without a protest against what we must regard as the learned affectation of Mr. Freeman in reference to his proper names. It may be remembered that in his former writings he astonished his readers by calling the battle of Hastings the battle of Senlac: in like manner, in these essays, the familiar San Zenone and San Vitale become St. Zeno and St. Vital, Trèves becomes Trier, Fiesole is Fæsulæ, Ariminum he puts for Rimini, and Kyme for Cumæ. As for the illustrations, which are reproduced from his own pen-and-ink drawings by photography, and in the process, as his preface assures us, have lost somewhat of their life and force, they should have remained in the privacy of the author's note-book, where doubtless they had their use as memoranda; as published, they seem not imperfect only, but illiterate. Their *naïveté* is an affront to the text. Good prints or photographs of the objects thus treated are easily accessible, and, if properly transferred to this book, they would have doubled its interest and value. As it is, the illustrations are a positive hinderance, and require too great an effort of imagination or of memory to fulfil their purpose.

[1] Historical and Architectural Sketches, chiefly Italian. By Edward A. Freeman, D.C.L., L.S.D. London: Macmillan & Co., 1876.

A MODEL TENEMENT HOUSE.

A PAPER READ BEFORE THE COMMITTEE OF THE STATE CHARITIES' AID ASSOCIATION, BY NELSON L. DERBY, F.A.I.A., DEC. 8, 1876.

THE improvement of the dwellings of the poor has been but recently attempted in England, and can be said to have been scarcely thought of as yet in other countries. Great manufacturers in France and Belgium have indeed built healthful and comfortable homes for their workmen; but in no city but London has an extended effort been made to provide for the proper shelter of the general poor. Other cities of England are now imitating the capital to a limited extent; and Liverpool and Manchester — provincial towns — are in this outdoing the metropolis of the New World, where the condition of the lower classes is still most wretched.

Starting with the assumption that buildings erected by the wealthier part of the community, for the accommodation of the poor, must return in rents a reasonable interest as times go, — say six or seven per cent net, — it remains to consider how much can be done to better the existing state of things. Various difficulties stand immediately in the way of all reform; and first of these comes in this case the unwillingness of the miserable poor to forsake their present loathsome quarters for lighter, airier, and cleanlier ones, especially as they will see themselves forced to assume habits of neatness and care to which they are unaccustomed. I

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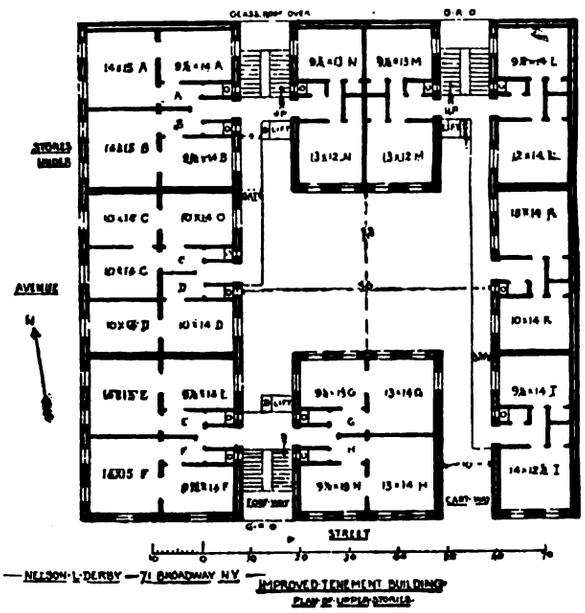
see no better way of meeting this evil than by making the rents of the better quarters *even less* than those of the present bad ones. This will be the easier from the fact that tenement property generally returns very high interest, considerably higher indeed than other forms of real estate. The great defect of the New York dwelling house, be it the home of rich or poor, is its great depth in proportion to its width. A frontage of (say) twenty feet, accompanied by a depth of often seventy or more feet, leaves a large central unlighted space in the house, which is occupied by the hall, stairways, and dark rooms. This is not found in Continental Europe, where stairways are almost invariably sufficiently lighted and ventilated by large windows. In the New York tenement houses six to eight utterly dark rooms are found upon every floor, unless the building be a corner one, when the number is reduced by one-half.

I consider the first desideratum of all to be a relief of this evil, which is easily effected by erecting the building around a hollow square of sufficient size. To gain the proper room, however, it would not be desirable to attempt to build upon a plat of ground of less than a hundred feet square: otherwise the rooms and passages surrounding the internal square, and having a necessary width on all sides of some thirty feet, would reduce the hollow square alluded to below the dimensions of forty feet on a side. If balconies are built around this at each story, — an approved plan in England to which I shall refer later, — the hollow square is still further diminished to a width of thirty feet. Now, tenement buildings to prove profitable should be about six stories in height at the present prices of land, or with the roof should attain to some seventy feet in height. Thus the hollow square would become a well into which light and sunshine would penetrate with difficulty. Dampness and its ensuing evils would result. This precaution has been neglected even in the better classes of buildings in our city. Impressed by this fact, I handed in to your committee some months ago a plan of an improved building running through from



street to street, a depth of two hundred feet, and having a frontage of a hundred and fifty feet on both streets. This provided for ample circulation of air and for sunlight in the interior. The capital required for its erection would form the great difficulty in the present hard times, but it appears to me to be the ideal solution of the problem. An expense of between one and two hundred thousand dollars having been incurred in building such a structure upon a desirable plat, it would doubtless return the six or seven per cent net referred to and even more. A suggestion has been made to build upon a plat of ground running through from street to street, rows of parallel houses having each a thickness of some thirty feet, and separated from each other by alleys sixteen feet in width, running north and south. These buildings would rise to a height of some sixty feet; and although it is true that about noon all these alleys would be bathed in sunlight for a half-hour, and that the breeze in summer would blow through them, their direction being north and south, yet at other times of the day, except in the top rooms these houses would be in the shade, and in general would prove unhealthful and stifling. It would also be impossible to introduce the balcony system of entrances in such narrow lanes. If the lanes were increased sufficiently in width, the loss of room would render the system unprofitable. In none of the rooms looking upon these lanes would the sun at any time shine directly into the interior except in the top rooms in the morning and evening, and in those at the southerly end of the house rows.

Returning, then, to the first system proposed, another advantage of a large plat of ground is that if the adjacent buildings were carried to great depth and height they would not interfere with the light or air of the building considered to as great an extent as if it were smaller. The best position of all would be the north-east corner of an avenue and street, with exposure on two sides, south and west, to the midday and evening sun, and shelter from the north and east. In the interior fittings of such a house direct light should be provided for every room, passage, stairway, and water-closet. All partition walls, floors, and stairs, should be fireproof. A separate water-closet should be provided for every tenement, and communication with it by a passage enclosed in the tenement. The external walls should be built hollow and of brick, so that cold, heat, and dampness are excluded, thus enabling the finish to be applied directly to all the interior faces of the walls without the intervention of furring and laths. The latter spaces which now harbor vermin would be done away with; and upon the walls themselves would come a coating of cement, not plaster. This cement coating would extend from floor to ceiling without a mop or wash board, also a refuge for vermin, and would cost some forty-five cents a square yard as compared with fifty cents for laths, plaster, and furring. It renders the walls drier, and is not easily injured by blows. Upon it should come a coat of paint to render it non-absorbent and easily washed. Wall-paper should be abolished. Hollow walls thus treated would prove stronger and no dearer than solid ones.

The floors should be constructed of iron filled in with patent blocks of cement, and covered with wood. The windows should extend up to the ceiling to assist in ventilating the upper portion of the rooms. On the interior it would be well to extend the recess to the floor, leaving no shelf. In the kitchens and washrooms the sashes could be hung upon pivots, so as to swing wide open and disclose the entire opening of the window, for the exit of steam and vapor. The size of each tenement has been found in London to be best fixed at two to three rooms. A few may be added of only one room for the use of single persons and childless widows. A greater number of rooms than three has been found to prove too expensive for the poorest classes, with whom this paper deals. A ventilated recess in the kitchen could contain a bed which by day would be covered. Experience has shown that it is well to have as few rooms as possible of the nature of bathrooms, laundries, privies, etc., common to several tenements. Whether it would be desirable to accept this experience and use the kitchen as a laundry, or to go back to the old practice and have a special laundry for every three or four tenements, to be used on separate days by each, is a matter of which the advantages and disadvantages seem to be pretty equally balanced upon both sides. The kitchen would be used as a living-room and dining-room as well; the other rooms of a three-room tenement would be bedrooms. Each tenement would be entered by a door leading into a hall from which other doors would if possible give access to each room and the closet. This hall would have a window. In the kitchen should be placed a copper boiler, range, sink, and lockers. A special locker could be contrived in the hall just mentioned, for meat, etc., ventilated by perforations through the wall. Here should be also ventilated boxes for wood and coal, supplied from bins arranged for each tenement in the cellar. In the kitchen, at one end of the sink, a conical deepened extension of cast iron would be useful for emptying readily pails of water. By the side of the privy I should place a dust-shoot or channel, down which ashes and sweepings could be thrown: these would mix with the contents of the former in cemented vaults in the cellar, and the whole would prove odorless, and could be removed every day by wagons. The drainage of the kitchen sink could pass into the ordinary sewer.

The question of the location of stairs is an important one. In the construction of a model building two plans are possible. First, a stone and iron fire-proof stairway could be built in a well-lighted hall, provided with plenty of windows, and communicating with as few tenements as possible on a floor. This of course, in a large building, would necessitate several stairways. Each tenement would be entered from the landings by one door leading into the small hall before described. A skylight above, capable of opening, aided by the windows, would thoroughly ventilate the stairs. Dirt is found to accumulate upon the dark stairways of ordinary tenement houses; but here it would be always visible, and a janitor would have it for his special duty to keep them clean. For our climate it would be well to warm these in winter, and this could be readily effected by steam-coils. It is said that these stairways form a means of communicating disease from one tenement to another. This would be remedied if they were well ventilated and cleansed by a janitor. The other system is the one referred to before, of building balconies of iron around the court-yard, at the level of each floor. From these open the doors into the tenements, and they are approached by fire-proof stairways. In our climate, exposed as these are to the air, ice and snow form upon them in winter, and cause great danger to the passers. All the interior room, however, devoted to main halls and stairways, is saved by them, and this is a great advantage; but they seriously darken the rooms, and diminish the size of the courtyards. People passing by the balconies can gaze directly into the windows of the rooms facing them; though these, to be sure, need be only kitchens and closets, the bedrooms facing the street. In England, where the winters are milder than here, they are found to answer; but I fancy that for

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winter use even there they cannot be pleasant. In Boston I have seen houses so arranged, but they were let to the very lowest classes; and I am assured that in New York they could be disposed of only to the same. However, much can be said upon both sides, and the matter is worthy of discussion.

The roof of our structure should be nearly flat, and cemented, be surrounded by an iron railing, and used as a place for drying clothing. A flooring of boards should cover this, with interstices to allow of the dry-shod passage of the users of the same. One or more elevators worked by a windlass should communicate with the roof and different stories.

The care of the halls and the entrances to the building, which should be wide enough for the passage of wagons, would be in the hands of janitors whose dwellings would overlook them. These janitors could also collect the rents, which, experience has shown, had better be paid weekly.

On the ground floor, especially if the building be located on the corner of a street and avenue, a number of stores would swell the rent-rolls much more effectually than tenements. Various inner portions could be utilized for reading, sewing, coffee, card, and bath rooms.

The location of such a building in New York would probably, as far as I can learn, best be fixed somewhere near the East River avenues and Seventieth to Eightieth Streets. There land is comparatively cheap, while communication is easy, and will be better when the elevated road is built. There are gas-works about a mile distant, from among whose laborers many tenants might be expected. If a site were looked for near the Five Points, or even near Fourteenth Street and the East River, land would prove very dear, buildings would have to be demolished to make room for the model house, and stores and warehouses would eventually drive it away. It would also be very hard to purchase a large tract such as I have described, at least, at a reasonable figure. Land further up town can be procured at from $2,000 a lot upwards.

The cost of the building can be deduced approximately by a comparison with other structures now erecting at a cost greatly reduced from that of two or three years ago. Cheap tenement houses are now building at the cost of six or seven dollars a square foot covered, being six stories in height. It would perhaps be safe to set our improved building at ten dollars per foot. If we took four lots, or 10,000 square feet, we should have to subtract for a forty-five foot interior square, about 2,000 feet, leaving 8,000 feet built upon, at a cost of $80,000. The land would cost another $10,000, making $90,000 in all. For a tenement of one room fourteen by ten, and a dark closet eight feet square, the poor pay now about eight dollars a month. For the same price, if we gave them two light rooms and a water-closet with the little hall, we should, getting some fifteen tenements on a floor, bring in thus $1,450 annually. The three-room tenements would in this proportion rent at eleven dollars a month. For five stories we should get a return of $7,250, and from the stores $2,000 more, — making $9,250, or more than ten per cent gross, which is ample to provide for a seven per cent net return. This computation assumes the selection of a corner plat.

THE ILLUSTRATIONS.

DESIGN FOR RESIDENCE AT SYRACUSE, N.Y. MR. C. W. ROMEYN, ARCHITECT.

(No. 124 West Thirteenth Street, N. Y.)

THIS house is built of brick, faced with red Croton brick laid in red mortar, with a course of tooth-work under lintels, and bands of black brick above and below course and sills. Cost, $8,000.

PROVIDENCE HIGH SCHOOL, PROVIDENCE, R.I. MESSRS. WALKER AND GOULD, ARCHITECTS.

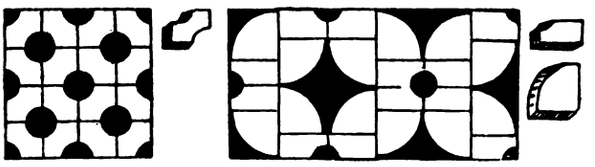
(No. 37 Weybosset Street, Providence, R.I.)

This is to be built of brick, with Amherst stone wrought work, on an underpinning of Westerly granite laid rubble, with split faces. The interior is arranged, on the first floor, for two girls' and two boys' schools with recitation rooms and wardrobes, a philosophical lecture-room with a small library and cabinet adjoining, and offices for the principals of the school. The philosophical lecture-room is connected by a small stairway to the chemical lecture-room which is in the basement. The remainder of basement, after providing for the boilers and coal-rooms, is used for play-rooms. The second floor is much the same as the first; the difference being an additional school-room in place of the lecture-room below, and a large recitation-room over the principals' rooms. The school-rooms are calculated to seat about seventy scholars each. The third floor will have an assembly hall 63x108 feet, a draughting-room, and two spare school-rooms. The building will be finished throughout in ash, in a very plain and substantial manner, and special attention will be given to the heating and ventilation.

HOUSE AT MOUNT DESERT, ME. MR. A. F. OAKEY, ARCHITECT.

(No. 44 West Seventeenth Street, New York.)

The first story is to be built of brick and stone, excepting the columns of the veranda, which will be of hard wood turned. The parapet of veranda is to be of brick with stone coping, and the panels filled with moulded brick so laid as to form open-work patterns, as shown, only three simple forms being employed. The roof



is shingled, and the rest of the building is timber and of simple construction. In execution, moulded brick will be introduced in the chimneys if economy does not forbid it; but the general form of the stacks will remain as shown.

WATER-GLASS.

NEW YORK.

EDITOR AMERICAN ARCHITECT AND BUILDING NEWS.

IN answer to the inquiries of your correspondent "C" in regard to water-glass, it may be said that it was applied thirty years ago to the woodwork of the Royal Theatre in Munich, to make it fire-proof. While engaged in studies upon theatre construction about ten years ago, I addressed a letter to one of the professors of the Polytechnicum at Munich, inquiring of him as to the efficiency of water-glass, and whether it had proved to be a success at the Royal Theatre. His answer was affirmative as to its success at the theatre, and strongly in favor of its use.

In Paris, water-glass has been used on the Louvre and other government buildings, to protect the stone against injurious effects of the weather. I cannot give my authority at present, but I have read it somewhere that Ransom's success in the manufacture of artificial stone is mainly attributable to the use of water-glass. In Germany it is also used to make thatched roofs fire-proof. It seems to me it could be used with success to make railroad passenger cars fire-proof, and prevent such calamities as happened at Ashtabula.

The most eminent authors upon the subject are its inventor, the late Dr. J. M. Von Fuchs, professor of mineralogy at Munich; and M. F. Kuhlman, professor of chemistry at Lille.

There are many good articles written in the technical periodicals of Europe, which may be found by referring to the "*Repertorium der technischen, mathematischen, und naturwissenschaftlichen Journal-Literatur*," a publication, by the way, which every Chapter of the A.I.A. ought to possess. Muspratt's and other works on chemistry also treat of water-glass. Several pamphlets upon the subject have been published, and may be obtained of Messrs. Westermann and Co., New York. In the London *Builder* of 1857, page 709, may also be found a good article. Water-glass has also been used as a preservative of fresco on the exterior of buildings.

Respectfully,

CARL PFEIFFER.

TO MAKE STONE WALLS WATER-PROOF.

BANGOR, ME.

Sir, — I noticed in the *Architect* of the 6th inst. a call for a process which will render stone walls water-proof. What is called Sylvester's method is said to have been applied to the walls of the gate-house of the Eighty-sixth Street reservoir, in Central Park, N.Y., the wall being still impervious to water under a head of thirty-six feet, as reported by the engineer in 1870, six and a half years after the application was made.

A year or two since, I gave the receipt to a friend who had built a stone cottage, which he could not make tight after several years' trial of the usual methods, including careful pointing and flashing. He told me a few days since, that he had tried the method, and that it was successful, the only drawback being a slight discoloration of the stone.

SYLVESTER'S METHOD OF PREVENTING MOISTURE FROM PENETRATING EXTERNAL WALLS.

Dissolve Castile soap in water, three-fourths of a pound to the gallon; dissolve one half pound of alum in four gallons water; both to be completely dissolved before using.

The walls should be clean and dry, and the temperature of the air not below 50° (F.), when the solutions are applied. First with a flat brush lay on the soap-wash boiling hot, taking care not to form a froth on the brickwork. Let this remain twenty-four hours, to become dry and hard; then apply the alum-wash, which may be at a temperature of 60° or 70°, and allowing it to remain twenty-four hours before repeating the soap-wash. Repeat the washes alternately till the wall is impervious to water.

I am not quite sure as to where I found the receipt, but think it was in the *Manufacturer and Builder*.

In my own experience, thorough pointing has proved so generally effectual that I always suspect hidden leaks — about window-frames and elsewhere — when water appears inside the building;

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but there is no question that stone and brick are sometimes very hard to deal with, especially horizontal surfaces, like window-sills, sill-courses, &c. I enclose the receipt for such action as you see fit to take, though it makes a long communication. Yours, G.

In answer to "C's" inquiry in your last number, I translate from Ramée's *Architecture Pratique*, a description of the original Kuhlmann process of silicatization: —

"The solution of silicate of 35° density (by Baume's hydrometer), as found in commerce, contains one-third its weight of dry silicate (of potash or soda). Diluting a solution of this density with one and one-half times its volume of water, we obtain the most suitable degree of concentration for application to stone. With these directions, any one can prepare a suitable solution.

"To dissolve the dry silicate, if it is procured in that form, is difficult, but is made easier by using, instead of pure water, water in which a little silicate is already dissolved. Pulverize the lumps, and adding the silicated water, boil the mixture, stirring constantly.

"The proportion of the salt above indicated, viz., one part to eighteen of water by volume, in the liquid ready for use, is not essential; but a stronger solution penetrates the stone less readily, and a weaker one requires more applications. The last coat may with advantage be slightly more concentrated than the others.

"For applying the silicate, the stone must be perfectly clean. In old buildings it must be scraped to a new surface; or, if this is impossible, brushed with a stiff brush and a lye of caustic potash. No acid must be employed. The solution is applied to large surfaces with a syringe and rose, first making troughs of clay at the foot of the wall to collect the excess of liquid. For small surfaces it is applied with a soft, thick brush, to take up as much solution as possible at once. Care must be taken to protect the windows with cloths, as the silicate will make spots difficult to remove.

"After each application an interval should be left of several hours, or better, a day. In general, three applications on three successive days will be sufficient. Too much of the silicate will give the stone a disagreeable glazed look, which must be rectified by washing the stone immediately, before the silicate is hardened by the air.

"The process may be applied at any season, except in freezing weather; but warm and dry weather is preferable. If the sun is very hot, cloths should be laid over, to prevent too rapid drying."

T. M. C.

BLACK BRICKS.

THE black bricks used about Boston are colored by heating red hot, and dipping the exposed surface into a pan containing half an inch or so of melted coal-tar. Soft bricks are the best. Hard bricks or hard spots prevent the tar from penetrating the surface, as it should do, to a depth of one-sixteenth to one-eighth of an inch, and the coating peels off. T. M. C.

[The method suggested by our correspondent is the one in use in this country, and so far as we know the only one, for coloring bricks after they come from the yard. It has not been in use long enough to test the durability of the result thoroughly. We have seen bricks treated in this way, which in three or four years lost their color decidedly by weathering; and others which retained it perfectly for as long a time. It is essential to its success that the bricks should be porous, and that they should be dipped very hot. On the other hand, if they are too hot, the distillation of the tar is likely to prevent its soaking into the substance of the brick. Successful coloring is a matter of experience, therefore. In some that we have seen broken, the tar had penetrated a sixteenth of an inch or more below the surface. There seems to be no reason why such bricks should not hold their color for a good many years; but all vegetable substances, we fancy, are likely ultimately to bleach. — ED. *American Architect.*]

CARVING AT PHILADELPHIA.

NEW YORK, Jan. 10, 1877.

EDITOR AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — It will not be amiss to state what was probably unknown to your correspondent in his description of decorative fine-art work at Philadelphia, under the head of American furniture, in your last issue, — that the articles made and exhibited by us were designed by the following architects of the city: sideboard and lectern, Thomas Wisedell; hall chairs, Arthur Crooks; font and cover, H. M. Congdon. The panel carved in Caen stone, subject "Battle of Birds and Beasts," suggested by Æsop's Fables, was designed and carved by J. W. Kitson.

Respectfully yours,

ROBERT ELLIN AND CO.

CONCRETE AS A FIRE-RESISTING MATERIAL. — A select committee of the House of Commons has been appointed to investigate the properties of concrete as a fire-resisting material.

A JOURNEY IN THE NORTH-WEST OF EUROPE.[1] — I.

THE GROOTE-KERK AT ROTTERDAM. — OUDE-KERK AT AMSTERDAM.

THE Groote-Kerk [of Rotterdam] has passed through various transformations. Its naked walls, of a uniform tint of coloring, present a cold and sad appearance; the choir and the chapels are closed; the windows have been despoiled of their colored glass; the transept and nave are filled with seats placed as in an amphitheatre, which hide the arcades, the bases, the shafts, and even the capitals of the columns of the side-aisles. The ancient edifice can no longer be recognized; it is degraded and mutilated, and the effect which it might otherwise produce is completely destroyed.

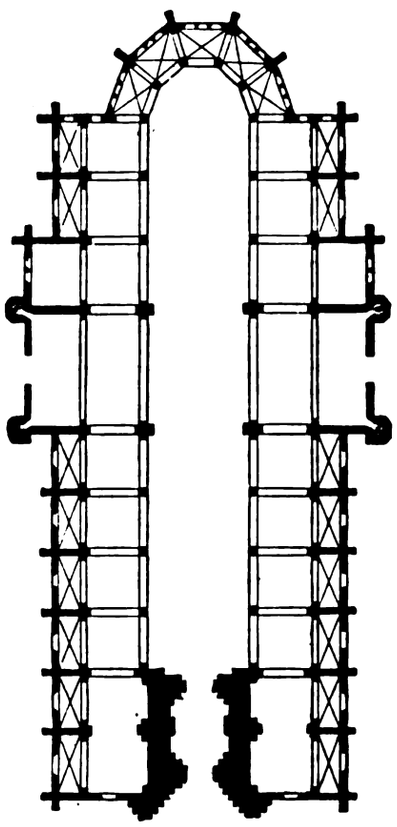

Fig. 2.

Yet, even such as it is at the present day, it deserves examination, and attracts attention. Its ground-plan (fig. 2) shows a certain kind of grandeur and much unity in the arrangements of the nave, transept, and choir; but the apse is poor, and the aisles surrounding the east end correspond badly with the rest of the building. The most curious part is the timber-vaulted roof which covers the nave, the weight of which rests on the ends of enormous bare tie-beams, which also serve to buttress the walls. The transverse ribs of the roof extend from aisle to aisle, and support the boards which form its framework; each of these ribs springs from a slender column or pilaster, also of wood, which extends down to the chapiter of the column, and is supported by it, its bearing being sometimes strengthened by a brace placed below.

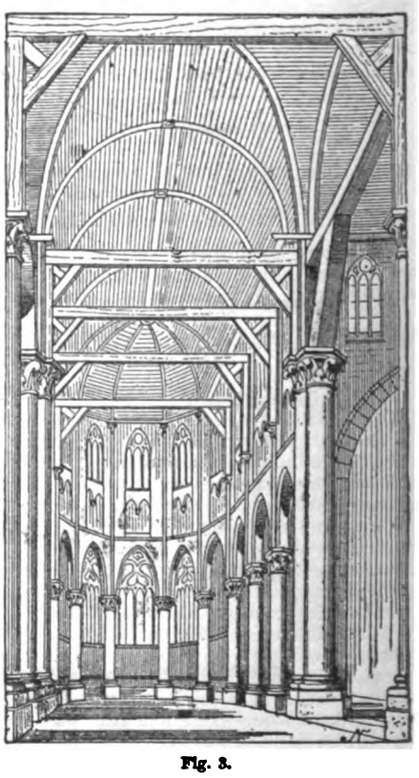

Fig. 3.

This very homogeneous structure is entirely independent of the main masonry. The profiles of the arches resemble those of stone voussoirs: they are composed of small pieces of wood indented together, thus forming a rigid system, but possessing sufficient elasticity to yield without breaking, and without losing their shape in consequence of the movements communicated to the whole building by an unstable soil.

Constructions of this kind are very frequent in the ecclesiastical buildings of the Netherlands. This is explained by the double advantage which they offer: first, in not imposing too great a weight on walls erected on a bad soil, and also in allowing architects to make use of those materials which, at the time when the churches were erected, were found abundantly

[1] A Journey of an Architect in the North-west of Europe. Translated from the French of M. Félix Narjoux by John Peto. From advance sheets, by permission of the publishers, James R. Osgood & Co., Boston, Mass.

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in the country, then covered with forests which have since disappeared. It is true that a fire — and they are frequent here — would soon have destroyed the whole. The timber roofs of the Groote-Kerk are in good preservation; they are of no older date

Fig. 4.

than 1513; they are not so well constructed, and are certainly less interesting than those of other buildings of which we shall have occasion to speak. The architect made his woodwork too massive for the purpose for which it was intended, and therefore the whole looks heavy and almost clumsy. This exaggeration of necessary solidity is, indeed, a general fault in Holland, where less than elsewhere we meet with delicacy and gracefulness.

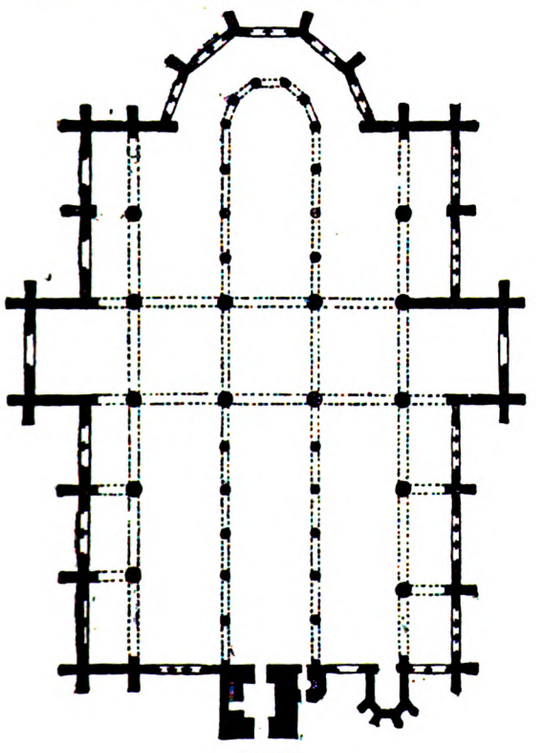

Fig. 58.

We see, at the entrance of the choir, an open screen in copper, of the *Louis Treize* style, of very remarkable workmanship, and with exceedingly rich decorations; there is also in one of the chapels another communion screen in copper, the tracery and sharp edges of which are in a perfect state of preservation.

The building is entirely of brick, except the points of support and some courses placed on the external façades, which are of stone (fig. 4), the white color of which contrasts strongly with the deep red of the bricks. The tower above the entrance was not erected till the seventeenth century; a wooden spire was then placed upon it, which was afterwards destroyed, and replaced by the tower of several stories which we see at present.

. . . . . .

We saw at Rotterdam a remarkable example of these wooden roofs: that which we examined at the Oude-Kerk of Amsterdam is still more interesting.

This church was founded in the fourteenth century, but the greater part of the structure dates from the fifteenth. Its ground-plan (fig. 58) is composed of a nave and a choir, both surrounded by a very wide side-aisle on which open chapels originally belonging to certain families who occupied them during religious ceremonies. At the time of its transformation into a Protestant church, there were very rich ornaments, valuable works of art, and as many as thirty-three gorgeous altars. All these treasures have since disappeared. The walls are bare, poor, and sombre in appearance.

Fig. 59 shows the general arrangement of the timber roof covering the principal nave. This vault is composed of cross-springers as well as wall ribs and diagonal ribs, which have the disadvantage of presenting outlines similar to those which would have been given to them if they had been constructed of stone. These arches are connected by cross-beams which render them rigid, and on which rest the planks forming the vault; the diagonal and wall ribs rest on a small corbel, while the transverse ribs spring from a slender column, the base of which rests on a tie-beam placed above the arches of the side-aisles. These tie-beams, which break the distance between the ground and the spring of the vault, were, no doubt, intended to maintain the side walls in a perpendicular position, and also served as internal supports and buttresses rendered necessary by the nature of the soil. The shaft of the columns is surmounted merely by a heading without sculptured capitals; the mouldings are meagre; the proportion of the arches is disagreeable. The arcades, which are above the arches of the side-aisles, are of inlaid work, a kind of decoration which has a very bad effect. . . . .

Amsterdam possesses many types of churches of that style which we have denominated Jesuit architecture. One of the most complete of these is the Wester-Kerk (the west church). This building was constructed in 1610, and from its steeple, which is 328 feet in height, there is a beautiful view all around, of the town, the Gulf of Y, and the Zuyder-Zee. The Roman Catholics of Hol-

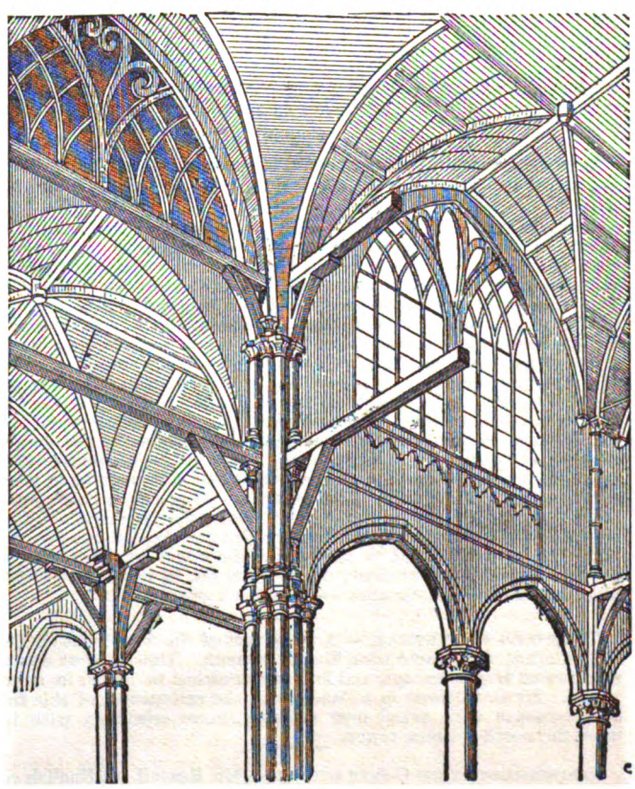

Fig. 59.

land, wishing to supply the place of the churches of which they were dispossessed during the sixteenth century, are now erecting a new one, dedicated to the Sacred Heart.

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NOTES AND CLIPPINGS.

AN OVERBURDENED ROOF. — A very curious accident occurred at Springfield, Mass., on the 8th inst, at the new freight-house of the Boston and Albany Railroad. The drifted snow accumulated on the roof of one of the two long platforms running along the sides of the building, and supported by iron braces against its brick walls, to such an extent as to force in a section of the wall, and so bring down the main roof. One man was killed, and nine were injured by the falling materials.

THE NEW ORGAN FOR TRINITY CHURCH, BOSTON. — The new organ built by Mr. Hilborne L. Roosevelt of New York, for Trinity Church, Boston, stands in an organ-chamber in the church, on one side of the chancel, one set of front pipes being on the chancel and another in the transept. The organist plays in the transept on the same level as the gallery, which is there. The organ may be said to be five stories high. The first is in the basement of the church, and contains the hydraulic engines and levers which supply the compressed air. The second contains the two large bellows and regulator (which steadies the wind), also a portion of the pedal organ. The third contains the great and swell organs and the rest of the pedal organ. The fourth contains the choir organ. The fifth contains the echo organ, which is situated over the ceiling of the church, and is connected with the body of the organ by electricity. This device was first used in the Roosevelt organ in Chickering Hall, New York. The *Vox Humana* was copied from the celebrated one in Freiburg. The construction of the wind chests is novel, each pipe having a separate valve which is controlled to a great extent by compressed air in the place of mechanical action. This facilitates the voicing and tuning and avoids any striking or "cyphering." The combinations on the pedals can be changed at any time, as the organist can set from one stop to the full organ on any pedal. The reeds and mixtures of the great organ are placed in the swell box, thereby greatly adding to the crescendo effects. The greatest feature in the instrument is the voicing, and upon this depends its main success. Mr. Roosevelt has aimed at combining in this organ, the English diapasons, the German flutes and gambas, the French reeds, and some of the effects produced on the Swiss organs. The wind chests of the pedal organ are the invention of Mr. Thomas Winans of Baltimore.

A PLUMBER'S MISTAKE. — A citizen of Cincinnati, instead of paying his plumber his account of $300 for services, sued him for the damage caused by the careless and unskilful way in which the work was done, and recovered damages of about $2,000.

ACCIDENT TO A LARGE SKYLIGHT. — The severity of the winter has already caused many accidents to buildings, many of which could and should have been guarded against by proprietors and architects. Doubtless the light falls of snow that we have had during the last few years have led proprietors to neglect precautions that should be taken with even the best constructed buildings. We cannot say who is responsible for the accident that happened at the Grand Central Railroad Depot in New York on the 12th inst., but it was evidently a needless accident. An avalanche of frozen snow, falling from an upper pitch upon a presumably unprotected range of skylights, destroyed about three hundred feet of thick glass. Luckily no one happened to be under this more than ordinarily dangerous avalanche, and the only sufferers were car and hack horses. We recollect that many years ago, a lady while making purchases in one of the large dry-goods establishments of this city was struck in the side by a piece of a skylight broken in a similar manner, and instantly killed.

THE RICHMOND THEATRE. — For seventeen years after the burning of the Richmond Theatre no theatres were opened in Richmond.

AZTEC RUINS IN ARIZONA. — A traveller writing from the White Mountain Agency, Arizona, describes the traces of ancient ruins in that neighborhood: "I examined some ancient ruins less than two miles from the military post up the east branch from the White River. The main buildings are of sandstone, the ledges of which are found in the bluffs about a mile distant. The outlying buildings were no doubt constructed of wood or adobe on stone foundations; but the *débris* of the main building, which covers about two acres of ground to an average height of about six feet, would indicate that they were entirely of stone. The form of the building was nearly square, and set due north and south. Some of the outlying buildings were circular. Owing to the little interest heretofore taken in the subject, scarcely any thing of a definite character has yet been obtained of the long extinct and forgotten race who in their day must have been a great nation. Of one thing I am assured, — they were an agricultural people, numerous and peaceable. All their ruins yet examined by me are along water-courses where there are rich farming-lands, or on great plains where water could be taken from the rivers for irrigation; and the remains of their irrigating ditches can yet be traced for scores of miles where they cut through stone or hard ground."

LICHFIELD CATHEDRAL. — A great part of the west front of Lichfield Cathedral is faced with Roman cement. This cement was applied about fifty years ago, and is now beginning to perish in several places. Sir G. G. Scott is to undertake the restoration of this front in accordance with detail now existing, more especially with that upon the north-western tower.

RESPONSIBILITY OF CONTRACTORS. — Mr. Reavell, an English contractor, was lately formally committed to await trial for manslaughter because, according to the verdict of a coroner's jury, he "had been guilty of culpable neglect" whereby a workman was killed while at work upon the steeple of a Wesleyan chapel which the contractor was erecting.

A HUMAN BREAKWATER. — The *Builder* says: The bursts of rain in the Carnatic are tremendous. As much as five inches of rainfall in a single night is not unfrequent, and Sir A. Cotton has known as much as nineteen inches of rain to fall in that time. The smallest rill that is allowed to trickle over the edge of an earthen bank wears itself a passage, and becomes a destructive torrent with extreme rapidity. On one occasion the water in the Veranum tank is said to have overflowed the whole twelve miles of the *bund*, and to have breached it in thirteen places. On another occasion the engineer in charge of the *bund*, finding the water rising with more rapidity than he was able to meet, made a wall of the bodies of his laborers, causing them to lie down close to one another on the top of the threatened part of the dam, and thus keeping back the two inches or three inches of water — which if unchecked, would soon have wrecked the whole *bund* and ruined a wide district — until their places could be supplied by basketfuls of earth. It was an original expedient, but it saved the district. What the laborers said about it, is not stated.

LARGE ROASTING-JACKS. — The Duke of Westminster has recently had constructed for the kitchen of Eton Hall a roasting-jack turned by water. The wheel is four feet in diameter, and five feet in breadth; it sets in motion six horizontal and four vertical spits, on which about a ton of meat can be cooked at the same time. But this is not so large as the spit called "Bir Nechin," in the banqueting-hall of ancient Tara, which is described in an old Gaelic manuscript preserved at Trinity College, Dublin, which says that this jack was composed of iron and wood, and had "twice nine wheels on its axles, that it might turn the faster; and there were thirty spits out of it, and thirty spindles, and thirty hooks, and it was as rapid as the rapidity of a stream in turning; and thrice nine spits, and thrice nine cavities [pots], and one spit for roasting, and one wing used to set it in motion." The household of the monarch of Erin for whom so large a jack was needed numbered about a hundred souls, for whose daily meal two cows, two pigs, and two salted hogs were cooked.

CHRISTMAS NUMBER. — The *Building News* is the only architectural publication that noticed the holiday season. This it did by publishing eight double-page and two single-page illustrations, all of marked excellence.

PUBLIC PROPERTY IN PARIS. — Lately published returns estimate the value of the national buildings in Paris as follows: Hôtel des Invalides, $2,400,000 (12,000,000 fr.); Bibliothèque Nationale, $2,400,000 (12,000,000 fr.); the Luxembourg, palace, gardens, and museum, $12,000,000 (60,000,000 fr.); the new Opera House, $8,000,000 (40,000,000 fr.); the Palais de l'Industrie, $5,200,000 (26,000,000 fr.). Strangely enough the value of the Louvre and its treasures has not been estimated.

NEW MUSEUM AT AMSTERDAM. — The first stone of a museum destined to receive the collections of works of art now in various public buildings in Amsterdam has been laid in that city. It is estimated that more than six thousand piles must be driven into the mud before a proper foundation for the edifice is secured.

DISCOVERIES AT ROME. — Among the interesting objects in the crypt recently discovered by two Roman peasants in a miserable plat of ground bought by them near the church of S. Rocco, Rome, are a gold and silver cup with reliefs representing an Eastern king hunting monkeys; a funeral bed with framework of oak and decorations of bronze; and a box inlaid with bas-reliefs of ivory coated in gold, and showing lions eating human bodies.

TRIPOLI. — At Tripoli the most notable ancient monument is a triumphal arch now buried in sand up to the middle. It was build of fine solid marble on which time and weather have had little effect. Many years ago it fell into the hands of its present owner, a Maltese wine-merchant, who after converting it into the principal wine-shop of the town made use of it as a warehouse, and it is now filled with casks and boxes.

GLASS BEARINGS. — It is said that glass bearings made of ordinary glass will sustain a pressure of ten thousand pounds per square inch before cracking, while others made of a special glass require upwards of twenty-seven thousand pounds to break them. They do well without lubricants, but a little oil is an improvement. Some have been used on wagons, and others have been tried in saw-mills with good results.

WHAT IS A CAR-LOAD? — Nominally a car-load is 20,000 pounds. It is also 70 barrels of salt, 70 of lime, 90 of flour, 60 of whiskey, 200 sacks of flour, 6 cords of soft wood, 18 to 20 head of cattle, 50 to 60 head of hogs, 80 to 100 head of sheep, 9,000 feet of solid boards, 17,000 feet of siding, 13,000 feet of flooring, 40,000 shingles, one-half less hard lumber, one-fourth less of green lumber, one-tenth of joists, scantling, and all other large timbers, 340 bushels of wheat, 400 of corn, 680 of oats, 400 of barley, 360 of flaxseed, 360 of apples, 430 of Irish potatoes, 360 of sweet potatoes, 1,000 bushels of bran.

A NEW CEMENT. — The New York *Tribune* gives the following recipe for a cement of superior character for uniting stone and resisting the action of water. It becomes as hard as stone, is unchangeable in the air, and resists the action of acids. It is made by mixing together nineteen pounds sulphur and forty-two pounds pulverized stoneware and glass. This mixture is exposed to gentle heat until the sulphur melts, when the mass is stirred until it has become thoroughly homogeneous, and is then run into moulds and permitted to cool. When required for use it is heated to 248° Fahrenheit, at which temperature it melts, and may be employed in the usual manner. At 230° Fahrenheit it becomes as hard as stone, and preserves its solidity in boiling water.

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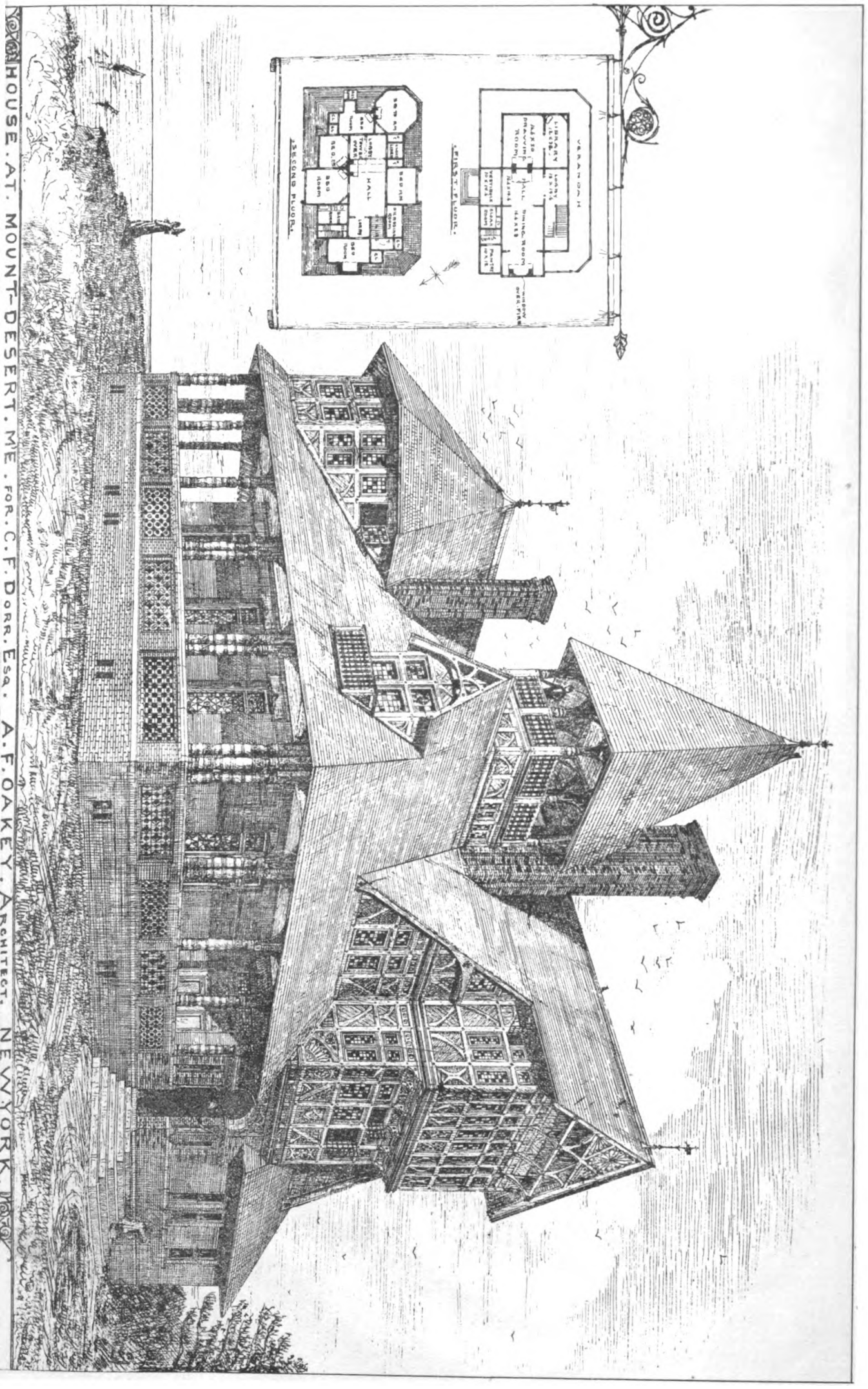

HOUSE AT MOUNT-DESERT, ME. FOR C. F. DORR, ESQ. A. F. OAKEY, ARCHITECT. NEW YORK.

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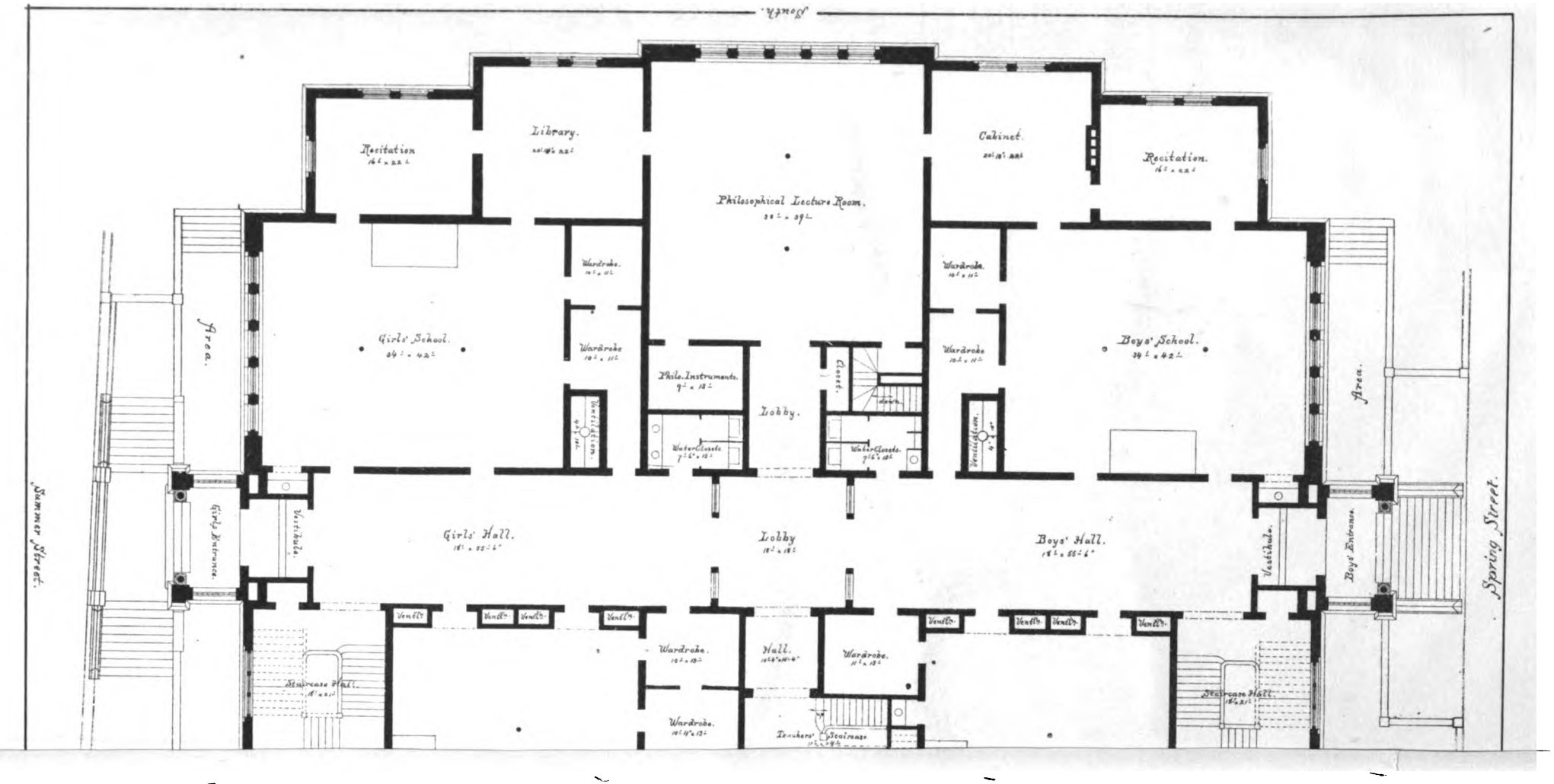
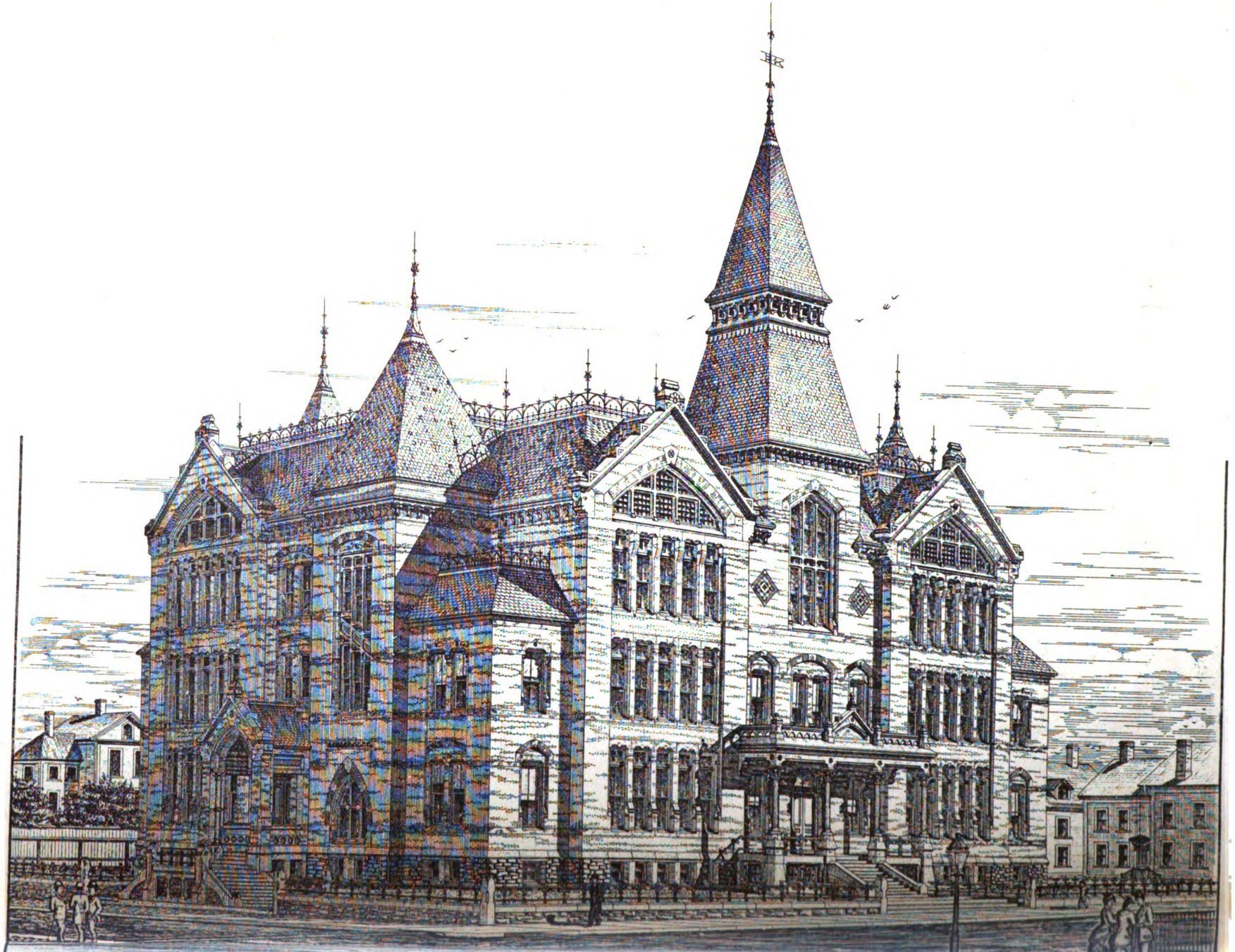
PROVIDENCE HIGH SCHOOL.

Wm. R. Walker. Thos. J. Gould. Archts.





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DESIGN FOR HOUSE AT SYRACUSE, N.Y.

G. W. ROMEYN ARCHT

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BOSTON, JANUARY 27, 1877.

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WE have received the printed report of the supervising architect of the Treasury Department, to which we alluded in our number of Jan. 6. We noticed at that time some of Mr. Hill's general recommendations. The report is a concise document, telling as usual the condition and progress of the work which has been going on under the supervising architect during the year, and giving the standard tabular statement of the cost and history of all the buildings, old and new, which come under charge of his office, including custom-houses, court-houses, post-offices, marine hospitals, appraisers' stores, mints, and assay offices, to the number of one hundred and fifty-seven. To this are added two lists such as we do not remember to have seen before, — one of all the appropriations made thus far for buildings which are now under construction, and another of contracts pending in the office at the date (September, 1876) to which the report is made up. The number of buildings given as in construction is twenty-nine, including post-offices at Atlanta, Ga.; Albany, N.Y.; Boston, Mass. (extension); Chicago, Ill.; Cincinnati, O.; Covington, Ky.; Dover, Del.; Evansville, Ind.; Fall River, Mass.; Grand Rapids, Mich.; Hartford, Conn.; Lincoln, Neb.; Memphis, Tenn.; Nashville, Tenn.; New York City (stairs and elevators); Parkersburg, W.Va.; Port Huron, Mich.; Raleigh, N.C.; Rockland, Me.; St. Louis, Mo.; Trenton, N.J.; Jersey City, N.J.; Little Rock, Ark.; and Philadelphia. Almost all these buildings are to serve also as custom-houses or United States court-houses. There are besides the custom-houses at Charleston, S.C., and New Orleans, which are undergoing alteration; the new assay office at Helena, Mont., and appraisers' stores at San Francisco, and the old mint in the same city, which is to be changed into a sub-treasury. Of the buildings (except the New York Post-Office, which is practically finished), the most important are the Philadelphia Post-Office, the Boston Post-Office extension, and the combined custom-houses and post-offices at Chicago, Cincinnati, and St. Louis, none of which are very far advanced in construction, and each of which, before it is finished, will cost some millions of dollars.

A COMPARISON of the table of appropriations with the account of expenditures gives some curious results. Some five or six years ago Congress, finding that the cost of buildings always amounted to more than was at first proposed, and generally very much more, adopted the policy of attaching to each appropriation the condition that the whole cost of the building for which it was given should not exceed a fixed sum. The old method of building by the day and with successive appropriations was continued, however, and its uncertainty was continued with it. Moreover the ideas of Congress as to the needs of the buildings, and the cost of supplying them, were on a very economical scale. A look at the tables in the report shows that of the buildings in hand, at least such as have been carried at all far, there are very few which have not outrun their appointed limit, except when that limit has been raised with successive appropriations. Thus the limit of the cost of the Chicago building was fixed in 1871 at four millions of dollars. Up to the date of the report, very nearly four millions had been expended on it, from which is to be deducted a million and a quarter for the cost of the site; and the stone walls had not been carried up to the main cornice. The first limit fixed for the cost of the post-office at Cincinnati was a million and three-quarters. It was afterwards increased to three and a half millions. More than two millions have been expended, and the basement walls are not up, though the stone is mostly cut for the first and second stories. The limit for the Hartford Post-Office was four hundred thousand dollars; three hundred and seventy-five thousand have been expended, and the stonework is set to half way up the second story. These are extreme cases, but there are many more or less like them. The work on most of the buildings has been in hand for three or four years; and the result shows that Congress has not known at all what it was undertaking, and that under the system in use it could not know. It offers the strongest argument for the adoption of the contract system, which the present supervising architect and his immediate predecessor have been earnestly advocating. It shows too the unwisdom of Congress in attempting, of its own judgment, to fix the limit of an expenditure of which it or any inexpert body could not possibly know the needs, nor could the strongest expert without the aid of elaborate plans and estimates. To set the limit of cost of the Philadelphia Post-Office, for instance, at a million and a half of dollars, with the experience of the New York and Boston buildings already well under way, as was done at first by Congress, was preposterous. A further difficulty is in the habit of making slow and inadequate appropriations. We notice that of the buildings now in hand, seven are either stopped, or likely to be very soon stopped, for want of the necessary funds. These stoppages waste not only time, but money; and this both by the inevitable increase of cost from checking work and beginning it again, and because an unfinished building deteriorates very fast, and if it waits long is sure when it is resumed to need considerable rebuilding before it can be carried forward.

THE last testimony reported, as we write, from the coroner's jury on the Ashtabula disaster, is somewhat significant. The master-machinist who had charge of the construction of the bridge testified that in building it, he found the material provided inadequate to the design. He told Mr. Tomlinson, and advised him to speak to the president, Mr. Stone, and soon after received orders to finish the bridge himself according to his own judgment. (It will be remembered in this connection that Mr. Tomlinson, according to his own testimony, after protesting against the use of insufficient material in the braces of the bridge, resigned his position on account of a disagreement with Mr. Stone about it.) The machinist further testified that he had not computed the strength of the bridge, or discussed its design, not considering himself competent. After Mr. Tomlinson's leaving he finished the construction, and the bridge was shipped to be put up. The mechanic who put it up by order of the president did not know how to do it, and confessed his dislike to ask directions from Mr. Stone, — whether from dread of that gentleman, or from fear of confession of incapacity, does not appear, — and the machinist "told him as much as he knew." The chief engineer of the road has committed suicide since his examination before the legislature. He had not, so far as we know, been charged with special responsibility for the accident; but the feeling that it occurred in consequence of the failure of work which was under his charge might well have seemed an intolerable burden. It is not desirable to express or to form a decided opinion while the investigation is pending; but the reflection suggests itself that a much less degree of sensitiveness than the unfortunate engineer has shown, on the part of the person who controlled the construction of the bridge, coupled with a little of the modesty of the machinist, might have saved a hundred or so of lives.

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ENGLISH papers mention a building accident which deserves some attention. One Mr. Barnes had engaged a builder to build him a house by contract, accepting the plans and specifications furnished him, and leaving the whole matter to the builder, since he himself knew nothing about building. He had been in the house but a week or two when a part of it fell down and killed his child. The coroner's jury rendered a verdict "that the death of the child was caused through neglect and the improper way in which the house had been built." The house was built of brick, with hollow walls; and the part that fell was on a cellar wall of lime concrete. The architect who was called to examine the house testified that the mortar in which the brick was laid was poor, and the concrete foundations were of improper quality. He attributed the fall of the house to the yielding of the concrete under unequal pressure from the brickwork. This and many other accidents which have lately happened from the giving way of concrete buildings show that, whatever be the merits of concrete as a material, it is the last in which shirking builders should be allowed to take refuge, as it is one whose behavior in adversity is least to be counted on. The cleverness with which a class of bad builders are learning to adjust the strength of their buildings, so that they shall be just able to bear up under their own weight and no more, begins to be appalling. But the significant fact in the case we mention is that the coroner's verdict was held by court to be equivalent to an accusation of manslaughter, and the builder was committed to be tried for that offence. If the laws in this country for the security of theatres, halls, and buildings generally in fact, could be clinched by the enforcement of such responsibility as is here maintained, the lives of the public would be safer.

AN effort is making in Boston to build a monument in commemoration of the Norsemen, who are believed to have been the first European discoverers of North America in the eleventh century. A rock lying in the Taunton River, in the town of Dighton, and known as the Dighton Rock, has long been a puzzle to local archæologists, because of certain inscriptions upon it which they have been unable to read, and which they have been inclined to ascribe to the Norse discoverers. On the other hand persons are not wanting who argue that the inscriptions on the rock are not different in character from many others found in the country, and which are ascribed to the Indians. The Danish society of antiquaries at Copenhagen was at one time induced to purchase the rock, but it was redeemed by the efforts of some gentlemen of Boston. The testimony of the Danish archæologists is not decisive. They have found, we are told, a conjectural interpretation for a small portion of the inscription; but it still remains doubtful whether it is or is not Runic. It has been proposed that the rock should be removed to Boston, — since the inscription is in danger of destruction where it now is, — and made to form part of the new monument.

WE believe that the theory of the Norse discovery is now pretty generally accepted; and the idea of the commemorative monument is a pleasant one. Monuments are good things to have, if only they are good monuments; and the more we build, the better we shall be likely to build them. There is an advantage to a country in having its early history visibly commemorated even when it runs back into dim legends; and it may not be amiss to New Englanders to be reminded that at least the rocks and the rivers existed before the landing of the Pilgrims. But with regard to the removal of the rock we would suggest that a vernacular rock is likely to be an ugly thing in a monument, as unmanageable as the Vicar of Wakefield's picture, and that the monument would probably be spoiled by having to be built to include it. Besides which, the interest of such a memorial is far greatest when it is in the place to which its memories belong. It loses half its charm when it is carried off and set down away from its natural associations. Let us fancy the rock at Tell's Platte hewn out and set down in Lucerne, or the Pilgrim Rock on view at the Boston State House. It must be nearly as easy to protect the rock from decay in its original surroundings as in Boston. This for those who believe that its inscription was the writing of the Norsemen. There remains the danger of incongruity that would result if the rock were really built into a monument to the Northmen, and it were afterwards found that the Vikings had been invoked to preside over a red man's diary.

MR. WOOD'S EXPLORATIONS AT EPHESUS.[1]

IT is now nearly fourteen years since Mr. Wood began his excavations at Ephesus, in the hope of fixing the site and finding the remains of the famous Temple of Diana, thrice built and thrice destroyed. It was the last of the three structures, raised by the common efforts of all the Ionian States after Herostratus had won his baleful immortality by burning its famous predecessor on the night of the birth of Alexander the Great, that was celebrated as one of the wonders of the world. Fired by the Goths in the second half of the third century, and soon after razed by the zealous Christians, it is said to have furnished Justinian with material for the building of St. Sophia. The description given by Pliny of this, the largest of all the Greek temples, with its hundred columns, some twoscore of which were sculptured, and mostly the gifts of kings, its splendor of marble and gold, and the allusions to it in other classical writers, inspired Mr. Wood with the hope of finding material for its restoration. Seconded by the influence of the authorities of the British Museum, he in 1863 secured from the Sultan a firman authorizing him to make excavations wherever he could get the consent of the land-owners, and set to work at his own expense upon his first researches; it was not till he had carried them as far as his own means would allow, that funds were put at his disposal by the trustees of the Museum, and afterwards by the British Government, which enabled him to carry through his undertaking. The field of exploration was very wide, and indications to the explorer very vague; but he persisted, in defiance of disappointments and difficulties, in spite of slenderness of means and rather distrustful support, through several years of ineffectual effort, at least so far as his main purpose was concerned, with an obstinacy of purpose that, as it is revealed in the record of his work, wins the reader's astonishment and admiration.

Mr. Wood's book, a thick and handsome quarto liberally illustrated with woodcuts and lithographs, is not an archæological essay, nor a systematic discussion of the ruins that he examined and the relics he discovered, but rather an illustrated diary of the progress of his work and his personal adventures in the prosecution of it. The method, or lack of method, with which the main subject is treated, may please the general reader by relieving his attention from the study of architectural problems, but is likely to be a stumbling-block to the professional reader, who may think that there is a great deal more told of the process of discovery than of the things discovered. It is by no means always clear how Mr. Wood arrives at the deductions he makes or at the restorations he contrives: in fact, of his processes of reasoning comparatively little is given; and while no great amount of the data are shown on which his conclusions rest, such as are given are not arranged so as to support them, but are thrown in as they come up in the course of his narrative, no effort being made to digest and order them. The reader, therefore, if he would test Mr. Wood's opinions and judge of his restorations, must go through the same processes that the author has, of gleaning the significant facts, weighing and combining them for himself, but with only a small portion of the author's data at hand. It may be hoped that at some time Mr. Wood will publish such a carefully arranged and illustrated account of his conclusions and their evidences, as will show just how much is knowledge, and how much is inference or assumption, with the facts on which all are based.

In his search for the temple Mr. Wood had for his guidance only certain references to it in the classics. The authors concurred in saying that the temple stood on low ground. Pliny says "on marshy soil, that it might not suffer from earthquakes." Vitruvius says that the shafts could not be transported on wagons because the roads lay low and soft. It was a furlong or two outside the city. A road led to it from the Magnesian gate in the city wall; and

[1] Discoveries at Ephesus, including the Site and Remains of the Great Temple of Diana. By J. T. Wood, F. S. A., Fellow of the Royal Institute of British Architects. With numerous illustrations from original drawings and photographs. Boston: James R. Osgood and Co.

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beside the road was the tomb of Androclus. Moreover a certain Damianus had built a *stoa* or portico of stone a furlong in length along the road, and leading to the temple, so that in rainy weather the priests could go to it from the city under cover. Hard by the temple ran a river, the Selinus. But around the hills on which the city was built lay on three sides broad and bare alluvial lands intersected by several streams. The gates and even the walls were fallen and buried. The old roads had disappeared, and there were no temple ruins to be seen. Some slight indications which he noted led Mr. Wood to search first on the west side of the city. The season of 1863 was wasted, so far as his main purpose was concerned, in fruitless excavations which consumed all the private means which he could spare for the search. At this point he obtained from the British Museum an allowance of one hundred pounds for the continuance of his excavations; but the trustees, preferring the bird in the hand, and apparently having no great faith in that in the bush, coupled the grant with the condition that his explorations should be confined to the Odeon or music-theatre, whose site was known. After a year's work and nearly a year's delay, a second allowance was appropriated to the great theatre; and it was not till 1867 that he obtained permission to use a small sum in continuing his search for the temple. This time he was fortunate enough to discover the eastern wall, and in it a gate which he identified, he does not say how, as the Magnesian gate. This was his first clear indication of the right direction in which to search. Uncovering two buried roads which led from this gate, he found that the pavement of that which led to Magnesia showed but little wear, while the opposite one, leading to the modern village of Ayasalouk, was worn into four deep ruts by the passage of chariot-wheels. He at once decided that this must be the road to the temple; and exploring it for some distance lighted at length on the remains of what he decided to be the portico of Damianus. At that point the funds allowed him gave out; and this and a visit to England interrupted the excavations for another year. The next year, returning to his work, he discovered farther down the road a massive foundation which he felt convinced was that of the tomb of Androclus. Finally when he had received a last grant of two hundred pounds with the assurance that unless he succeeded by its help in finding the temple he must not expect further assistance, and when any real indication of the exact site was as little to be seen as ever, by a lucky excavation he hit upon a heavy wall, at an angle of which were duplicate inscriptions in Latin and Greek telling him that this wall had been built by Augustus, and that it was to be maintained out of the revenues of the temples of Diana and Augustus. This then was undoubtedly the wall which Tacitus says that Augustus built about the temple, to mark the limits of the right of asylum which it afforded to criminals. This *peribolus* wall itself, by the way, Mr. Wood stigmatizes as disgracefully poor work, "probably contract work." Thus after six years of persistent work in the face of opposition from the inhabitants, impediments from the authorities, mistakes and disappointments, slender resources, distrust, fatigues, illness, and even personal violence, he at last found assurance of success.

After another visit to England he returned with a new allowance from the trustees of the Museum. He continued his excavations, and on the last day of 1869 discovered a part of the pavement of the temple itself, twenty feet below the surface of the ground. Further examination discovered a number of interesting fragments, — a drum of one of the sculptured columns, a capital or two, fragments of frieze-sculptures, a base with its plinth, in position, a mosaic pavement representing a Triton, and others. These fragments, sent home in government ships whose assistance was procured by the authorities of the Museum, gained him an appropriation of six thousand pounds from the British Government, after which the excavations were carried on rapidly till the whole immense area of the temple itself was uncovered and examined, a process which lasted till March, 1874, when the work was abandoned, and by which time sixteen thousand pounds in all had been expended during eleven years of work.

Examination showed that the temple had been three times built on the same foundation, and that after the burning by Herostratus it had been rebuilt not only on the old foundation, but on the old plan. The pavement first discovered proved to be that of the first of the three temples, or, as Mr. Wood more cautiously calls it, the last temple but two. Subsequently portions of the pavements of the later temples were uncovered, the last some ten feet above the level of the first, showing that each time the temple was rebuilt the floor was raised four or five feet. A curious confirmation of the old accounts of the temple was found on digging below the pavement. Pliny and other writers say that to prevent the dampness rising in the temple, a bed of charcoal was laid under the floor, and upon this fleeces of wool were placed. Accordingly Mr. Wood found, five feet or more below the lowest floor, a layer of charcoal three inches thick, between two layers of a putty-like substance which proved to be a mortar containing traces of organic matter. Portions of the wall of the *cella* and of the outer line of steps and the bases of some columns, found undisturbed, gave an opportunity of measuring the size of the temple. The platform at the lowest step measured four hundred and eighteen feet by two hundred and forty (nearly), showing that the measurements of the *universum templum* given by Pliny — four hundred and twenty-five Roman feet by two hundred and twenty — included the whole platform. The temple was found to be octostyle and dipteral, as described by Vitruvius; the number of columns in the peristyle, as laid down by Mr. Wood, including those between the *antæ* of the *cella*, agrees with the number, one hundred, given by Pliny. The finding of sculptured drums opposite each end of the building whose long axis was east and west, indicated that the porticos on both fronts were of sculptured columns; and since the normal arrangement of an octostyle temple gives eighteen columns in front of each end of the *cella*, Mr. Wood concludes that the thirty-six *columnæ cælatæ* (sculptured columns) mentioned by Pliny were in these positions, especially since they are so shown in a medal of Hadrian's time, which shows a high band of sculpture above the bases of the columns under the pediment.

It is impossible to follow Mr. Wood through the unrecorded train of argument which has led to his restorations. For some of his conclusions he gives reasons, others are left without any thing to tell whether they are inference or conjecture. In many respects his restoration looks more Roman than Greek. Instead of two or three high steps around the platform, there are fourteen of only eight inches rise and nineteen inches tread. The Ionic order as restored has a half-Greek, half-Roman look. The height of the entablature is nearly one-third that of the columns. Fragments were found which gave authority for most of its parts, — the architrave, sculptured frieze, and the cymatium, at least, of the cornice, carved with a honeysuckle ornament and lions' heads, — how much more does not appear. The addition of dentils, made perhaps in deference to the indications of Hadrian's medal, and the height of the frieze in proportion to the architrave, give a Roman look to the entablature. The height of the columns has been fixed by the writer according to the proportions of Vitruvius, from the measured diameter of the drums at the base. Eight and a half diameters of six feet and half an inch, plus the base and capital, give a total height of fifty-five feet, eight and a half inches, which accords sufficiently with the height of sixty feet (Roman) assigned them by Pliny. The capitals are of an ordinary Greek form, the bases as near as may be like those of the better-known temple in the neighboring city of Priene, — a fluted torus at the top, and below it three narrow double beads with two *scotiæ* between them. One of these bases was found with the red color still preserved in the *scotiæ*. A curious bit of detail was "a fragment of moulded marble with two astragals, between which was doubled a narrow strip of thin lead, a strip of gold being inserted in the fold," — a hint of the splendor of decoration which, more than its architecture perhaps, led to the classing of the temple as one of the seven wonders of the world.

It is not easy to make out from the work how much of his discoveries the author assigns to the different temples he unearthed. The lower pavement would appear to have been the best preserved. In this, which was of nicely fitted blocks of marble of random shapes, was found a line of mortises between the *antæ* of the *pronaos*, as if to receive the uprights of a metal screen or grill. A socket of copper or bronze remained in one of the holes. In the polished white

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marble pavement of the intermediate temple, four feet higher, were found marble tracks resting on solid foundations, and showing the grooves in which the wheels traversed that supported the heavy doors. The position of the mortises for the frame showed the width of the door, which was in two parts, to have been fourteen feet, eight and a half inches. The roof was evidently tiled with marble, many fragments being found, both of the flat tiles and of the curved tiles which covered the joints in the others. On the vexed question of the *hypæthrum*, Mr. Wood decides in favor of a simple central well. Around this he ranges, as usual, two orders of small columns; for examples of which, however, he points only to one fragment of a Corinthian shaft that he supposes to have belonged to the upper, and which, curiously enough, is elliptical in section. He assumes a lower order of Ionic columns, also with elliptical shafts.

We have confined our attention to what Mr. Wood has said of his search for the temple, since that was the *raison d'être* of all his labors. He gives his readers, however, restored plans of several other buildings, — the Odeum and great theatre, for instance, — both classical and Christian, and accounts or illustrations of many interesting fragments and inscriptions. The lithographs in the volume are fair, and many of the woodcuts excellent.

THEATRE FIRES.

THE following digest has been prepared at the request of the committee on revision of the New York Building Act, appointed by the New York Chapter of the A. I. A. It consists of a condensation of the chief facts contained in a treatise by Aug. Fölsch of Vienna, on the general subject of theatre fires, which he has investigated in a most masterly manner. This work was published by Waldheim, Vienna, 1870. I have taken the liberty of drawing an occasional inference, and suggesting an occasional change in our own laws, in the course of my paper.

DEC. 15, 1877. NELSON L. DERBY.

All experience has shown that in theatre fires, either the incipient flames are immediately extinguished, or the whole building is consumed. There is no half-way in the matter. At the Haymarket Theatre in 1867 in London, seventeen steam fire-engines and as many hand-engines were unable even to restrict the flames of the burning building to itself alone. If such a fire once gains headway, from the presence of the vast amount of combustible matter about the stage, no fire-proof construction can long arrest it. The strongest masonry is destroyed, marble burns to quicklime, cast iron is cracked and broken, wrought iron bends and gives way, and the building is as fully destroyed as if it were of wood. Statistics of fires show further, that in no theatre fire has any thing of value ever been rescued, so quickly do the flames spread.

Within the last century 130 theatres have been destroyed by fire. Some theatres, as Astley's Amphitheatre in London, have been burned three times. Of these 130 theatres, 17 were burned in London, 19 in Paris, and fewest of all in Italy, though in that country there are more theatres in proportion to the population than in any other part of the world. The mild climate of Italy requires little heating of theatres in winter, and spectacular pieces are uncommon. These reasons account for the fact stated. Between 1863 and 1869 — seven years — 43 theatres were burnt in different parts of the world.

Of all such fires it is found that 52 per cent take place between Dec. 1 and April 1; 48 per cent take place during the two hours after the close of a performance; 21 per cent during a performance. This is occasioned by sparks from fire-works, etc., used in spectacular pieces, which fall unnoticed, and cause a fire to break out after the close of the performance. This shows the necessity of keeping a sufficient number of watchmen, especially during the night in theatres, who shall be ready to extinguish the incipient flames. The necessity of a constant, even daily inspection of theatres, is proved by the burning of the Berlin Opera-House in 1843. The reservoir could not be used because the machinist was at home with the key in his pocket. Such doors should never be locked. At the Dresden fire, the wire curtain was found rusted and immovable, and all the reservoirs empty. In the fire at the Käruthnerthor Theatre in Vienna in 1761, many people were lost because the lower windows were covered by an iron grating. In the fire at Carlsrühe in 1847, some of the stairways from the upper galleries were locked. This was done to save doorkeepers' wages. Not only were they locked, but nailed and battened fast, while their existence was unknown to many. — This suggests the desirability of compelling managers to hang plans of their theatres on a large scale at various points in the building. — These doors were broken in at last; and this, with the accidental presence of several oil lamps which burned after the gas was shut off, saved many hundred lives.

In a large theatre it is necessary to keep on hand scenery and decorations for three or four pieces at least. This with the vast amount of cordage, bridges, traps, etc., found on every stage, points to the fact that the most important measure of all is to require all these inflammable substances to be soaked in or painted with some fire-proofing solution. Most desirable also is a law requiring that all draperies and decorations in churches and ball-rooms, as well as in theatres, should be thus protected; also the costumes of actors, especially the gauzy coverings of ballet-dancers. It appears, however, that many fire-proofing solutions which have been tried have been found after a time to lose their efficacy besides affecting the colors used in decoration. In Vienna, among other substances borate of magnesia has been tried, and found to fail. After many attempts there, to-day no substance is in use. Mr. Boucicault, I see, recommends tungstate of molybdena; but there is no doubt that the matter should be placed in the hands of chemists and thoroughly experimented upon.

In 41 per cent of all theatre fires, the flames have reached and destroyed the adjacent buildings; in 36 per cent of all cases these buildings have been attacked but saved. This points to the absolute necessity of isolating theatre buildings on all sides.

The loss of the Dresden Theatre was caused by the use of benzine in painting. This substance should never be allowed to pass the door of a theatre.

To show that the Brooklyn fire was by no means the most destructive of life of all theatre fires, I quote from our author that at Saragossa in 1788, 600 lives were lost; in Quebec in 1846, 500 perished.

The author now goes on to describe the Vienna Opera-House, which in comfort, interior taste, excellence of ventilation, solidity, and ingenuity of arrangement, is second to none in the world except the new Paris Opera-House, and is fully equal to this in many respects. On each side of the stage are two three-foot walls seven feet apart. These are stiffened by vaults running their whole length, and forming passages nine in number upon each side. These walls support the iron stage roof under which is suspended an iron and brick ceiling. A wire curtain weighing three tons and counterpoised is suspended above the proscenium opening. It is let down every night, and is seldom raised during rehearsals. Its meshes are only three-fourths of an inch wide. It takes a quarter of an hour to raise it, but by loosening the windlass and applying a brake it can be lowered rapidly though gently.

The building is warmed by steam and well ventilated, while it is possible to shut off the gas from the stage and auditorium without extinguishing that upon the stairs and corridors.

Two mains supply this theatre with water; one supplying exclusively the daily use, the other the fire service. Could we not, in view of the scarcity of Croton water, connect pipes with the rivers, and fill our reservoirs with salt water for the latter purpose, with the aid of steam pumps?

Reservoirs in the Vienna Theatre are placed above the rear stage. In the inspector's room gauges indicate the height of water in the same, whilst other registers show the temperature of thirty different points in the building. Through speaking-tubes, telegraphs, pipes, etc., he has control of the temperature and the water and gas supply of all parts of the theatre. The reservoirs above mentioned feed pipes running through the vaulted passages already described, also across the stage-bridges, under the stage, and to the store-rooms. These pipes are above ten inches, below five inches, in diameter. At frequent intervals are stop-cocks to which are attached flexible tubes with half-inch nozzles. In each passage by the side of the stage are small slits opening to the stage and closed by iron doors. Through these hundred and fifty openings half as many streams can be directed upon any portion of the scenery upon or above the stage.

Ten men are employed to watch this theatre, and of these eight are on duty during the performance and four by night. They are controlled by six dial registers.

The author concludes with a few suggestions, among them that theatres should be connected with the nearest engine-house by telegraph; once a week all fire-extinguishing apparatus should be overhauled (this is a regulation in the Vienna Theatre); only Swedish matches should be used (also in force at Vienna); and the watching of all theatres should be placed in the hands of the city fire brigade.

THE ILLUSTRATIONS.

DETAILS FROM THE HOUSE OF MARTIN L. BRIMMER, ESQ., BOSTON, MASS. MR. R. M. HUNT, ARCHITECT.

(28 East 21st Street, New York, N.Y.)

THIS drawing was prepared for the album of the Portfolio Club by Mr. G. M. Wells.

UNION CHAPEL, MORRIS PLAINS, N.J. MR. A. B. JENNINGS, ARCHITECT.

(71 Broadway, New York, N.Y.)

COUNTRY CHURCH ON ORANGE MOUNTAIN, N.Y. MESSRS. POTTER AND ROBERTSON, ARCHITECTS.

(52 William Street, New York, N.Y.)

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KEEPER'S DWELLING, WAITING-ROOMS, ETC., SALEM FIELDS CEMETERY, L.I. MR. HENRY FERNBACH, ARCHITECT.

(346-8 Broadway, New York, N.Y.)

STABLE FOR T. S. MANDELL, ESQ., NEWTON, MASS. MR. W. WHITNEY LEWIS, ARCHITECT.

(5 Pemberton Square, Boston, Mass.)

This stable gives accommodation for four horses, there being two stalls and two loose boxes. The washing floor is so placed as to be easily approached either from stalls or carriage-room, from which it can be separated by sliding doors, and the space so enclosed can be warmed by a stove in the harness-room. The billiard-room and man's room are reached by a separate entrance, without passing through the stable. The outside will be finished with clapboards, and the roof slated. The principal rooms are to be sheathed inside and finished with varnish.

CORRESPONDENCE.

ANNUAL REPORT OF THE SUPERINTENDENT OF BUILDINGS. — ACCIDENT AT THE GRAND CENTRAL DEPOT. — THE PROPOSED OPERA-HOUSE. — THE JEFFERSON MARKET COURT-HOUSE.

NEW YORK.

THE quarterly report of Supt. Adams of the Building Department here, just published, closing the calendar year 1876, is not altogether as gloomy a document as the depression in professional labor for the past season would seem to warrant. In his recapitulation Mr. Adams finds that "it is encouraging to note that the average building activity has not materially decreased." But this view is based upon the estimated cost of the works. The work has been in most part the duplication of tenement houses or the multiplication of brown-stone fronts. Architecturally the season has been bald and profitless. Little or nothing has been added to our city's display by the efforts of the architects, and from office to office the same reply of "only a little country work" is met in response to inquiries as to work in hand.

Taking the work of the closing quarters of the past three years, the Building Department report shows: —

	1874.	1875.	1876.
Plans submitted for new buildings,	198	160	137
No. of buildings embraced,	343	298	255
Estimated cost of same,	$3,775,170	$3,023,600	$2,804,430
New buildings commenced,	285	271	237
" " completed,	396	383	481
Plans submitted for alterations,	175	162	163
No. of buildings embraced therein,	190	163	179
Estimated cost of same,	$668,115	$329,190	$258,658
Alterations commenced,	168	140	172
" completed,	234	244	222
New buildings in progress Dec. 31,	....	578	651
Alterations " "	....	100	125

Of the 137 applications for the erection of new buildings, 116 were approved at first inspection, 18 were altered and subsequently approved, and 3 rejected outright; for the whole year 1876 this would make a total of 737 plans approved and 23 rejected. In alterations for the past quarter, 137 plans were approved, 22 altered and approved, and 4 rejected; for the year, 1,034 approved, and 56 finally rejected.

The number of sets of plans submitted during the several quarters of the past three years stand as follows: —

	1874.	1875.	1876.
1st Quarter,	224	202	196
2d "	244	296	267
3d "	172	161	160
4th "	198	160	137
	878	819	760

Summarizing the work of the past four years, the progress of building in the metropolis is very clearly shown in the grand estimates of cost as follows: —

YEAR.	NEW BUILDINGS. No.	NEW BUILDINGS. Cost.	ALTERATIONS. No.	ALTERATIONS. Cost.	TOTAL COST.
1873	1311	$22,276,645	1139	$3,496,995	$25,773,640
1874	1388	16,706,997	1429	3,610,112	20,415,109
1875	1406	18,072,850	1258	3,076,473	21,149,223
1876	1379	15,898,240	1177	3,635,478	19,533,718

As showing the general scope and character of the work covered by the figures of the past quarter, the report gives the distribution of the 255 buildings proposed as follows: First-class dwellings, 102; second-class, dwellings, 18; French flats, 24; hotel, 1; tenements, 40; first-class stores, 10; second-class store, 1; third-class stores, 2; office building, 1; manufactories and workshops, 23; school, 1; church, 1; public buildings (fire houses), 2; stables, 11; frame buildings (in suburban section of city), 18.

The reports of the several bureaus of the department are of interest. In the inspection of iron-work, charged with the testing of every iron lintel, girdle, and beam used, the year's work showed but one defective lintel. During the year, 1,688 fire-escapes have been added to dwelling-houses by order of the Department, 1,531 buildings have been made safe, and 71 entirely taken down; making a total for the past 11 years, during which time accurate data have been preserved, of 8,270 structures strengthened, and 552 entirely taken down.

In a recapitulation of the year's work, Superintendent Adams gives his views at length on the Brooklyn Theatre accident. The confusion in the duties of the several departments of the city government, which might be considered a chronic defect in our municipality, gives the superintendent a cover of escape for any responsibility he may seem to have shirked in allowing the erection and maintenance of the theatrical fire-boxes with which our metropolis is so well supplied. After detailing a list of protective devices which seem to him desirable, such as brick proscenium walls, iron screen and drop-curtain, iron staircases, abundance of exits, wet blankets, sprinklers, hose, etc., the report goes on to say that "having heretofore regarded them as under the supervision of the Department of Health or Fire, it came to be the custom of officers on the Department of Buildings to recommend these important protections, rather than order them with the authority of law. . . . It was not until the appalling disaster in Brooklyn had aroused public feeling to a realizing sense of the mighty perils to which thousands are exposed, that some absolutely authoritative interpretation of the law was demanded." The section of the building law governing the point at issue is quoted by Superintendent Adams, and reads as follows: —

"§ 29. In all buildings of a public character already erected or hereafter to be built in said city, such as hotels, churches, theatres, school-houses, restaurants, railroad depots, public halls, and other buildings used or intended to be used for purposes of public amusement or instruction, the halls, doors, stairways, seats, and aisles shall be so arranged as to facilitate egress in cases of fire or accident, and to afford the requisite and proper accommodation for the public protection in such cases; and all aisles and passage-ways in said buildings devoted to purposes of amusement or instruction shall be kept free from camp-stools, chairs, sofas, and other obstructions, during any performance, service, exhibition, lecture, concert, ball, or any public assemblage; and the superintendent of buildings may at any time serve a written or printed notice upon the owner, lessee, or manager of any of said buildings, directing any act or thing to be done in or about the arrangement of the said buildings and the several appliances therewith connected, such as halls, doors, stairs, windows, seats, aisles, and escapes, so as to afford the greatest possible security to the public in the uses to which they may be severally applied."

Of course the interpretation was as everybody but the studiously obtuse officials would make it, — that the proper and safe erection of a building lay with the building department; and now the inspectors are busy scurrying about, poking about the playhouses, preparing diagrams of them; and as a result of their work, several have undergone alterations, and one, the Olympic Variety Theatre, has been forced to close its doors for thorough overhauling.

On Friday morning, the 12th inst., a large section of the great glass roof of the Grand Central Depot fell. In the building there is a central section of the roof running along the ridge, raised above the other portions of the roof about eight feet, the sides forming a louvre for the escape of smoke and gas. The snow and ice had accumulated upon this top section. The slide was upon the east side, where the sun had loosened the hold of the ice on the iron, and two feet of ice and snow falling upon the glass broke it for a length of nearly two hundred feet. The panes of glass were about nine by two feet, and five-eighths of an inch thick, and over two hundred and fifty were brought down by the crash. It was formerly the custom to shovel off this top roof section after storms; but during this season this precaution was neglected. The building was designed by Supt. Buckhout of the New Haven Railroad Company as engineer, and J. B. Snook of this city as architect.

Hardly a season passes without the collapse of some building by the weight of snow upon the roof. A couple of years ago a church in the central part of the city was reduced to a mass of ruins between services one Sunday, by the superincumbent mass of ice on the roof. And the snow-slides from roofs are a constant source of annoyance and danger to pedestrians upon our street-walks.

Under the class of the "may-be's" should properly be placed the work of Mr. Arthur Gilman upon a grand opera-house for Mr. Strakosch, the impressario. The body of the house measures about 200 by 125 feet, with projections for stairways, etc. It is a close copy of the La Scala of Milan. Without, the work is in Italian Renaissance. Within there is a stage 50 x 67 feet, and an auditorium 105 feet from curtain to back of boxes, and a width of 90 feet, with a height from orchestra floor to ceiling of 65 feet. There are five box balconies with 80 boxes in each tier. There will be seats on the orchestra floor for 650, and in the upper gallery for 500 more, making the total capacity of the house about 3,000. The specifications call for a fire-proof construction throughout; concrete, tiling, and Tiel blocks are liberally used, with iron supplying the place of wood. It is a grand design on paper, and before long we shall know how many millions it will need to give this fancy a tangible shape.

More original in conception and now nearly completed is the Jefferson Market Court-House by Withers and Vaux, which some of our art critics declare to be the only piece of architecture with brain in it which our city can show, and which everybody agrees in declaring a gem in our street architecture: standing at the junction of several streets, it may be studied from ever so many points, and from each it will repay a long, careful survey. It is "Englishy" throughout, and shows that Messrs. Withers and Vaux have kept pace with the creators of Victorian Gothic across the sea. At some day it will make an interesting story to relate the contest of Cushing *vs.* Withers, and how a contractor, balked in his efforts to get disproportionate bills for extras, threw mud at

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the architect. The introduction of the British surveyor or maker of bills of quantity was looked upon as a system of levy imposed by the architect; and generally the history of the charges and their refutation will teach all members of the profession that too much care cannot be taken in having all instructions to the workmen conveyed through the medium of the drawings and specifications, and holding each and every contractor to the uttermost item of work demanded by the exact letter of these documents.

The New York Chapter of the A. I. A. will hold its usual winter reception about Feb. 22, at the rooms of its president, R. M. Hunt, on Twenty-first Street near Broadway. A programme for a competition between the junior members of the Institute has been issued, and the reception promises to be an instructive and enjoyable one.

THE LOAN COLLECTION. — THE FURNITURE OF ST. GEORGE'S HOUSE. — THE PUBLIC BUILDINGS. — THE CATHOLIC FOUNTAIN. — THE BELLS OF ST. MARK'S. — THE THEATRES.

PHILADELPHIA.

THE loan collections, as a sort of dual exhibition, were opened last Monday evening, 15th inst., at the Academy of the Fine Arts. The north range of galleries has been devoted to the pictures, while the southern suite has been given over, for the time being, to the "Pennsylvania Museum and School of Industrial Art." The former has been arranged and catalogued with the usual care, while the latter is still only partially tabled and arranged. In fact, the general appearance of this portion suggests that the managers of this institution have a tendency to make it fulfil the first portion of its title at the expense of the second. If one might judge by the appearances of this collection, and the character of the objects exhibited, it would seem simply that the opportunity had been taken by a select portion of the community to show to the rest their *penates* and spoils of travel; indeed, judging from the comments one cannot help hearing, one might think that the name of the depositor is quite as much an object of interest as the article loaned.

Commencing in the corridor, which is enclosed by drapery on the arcade side, the wall hangings, one a fine large old Gobelin tapestry, and a remarkably good large rug from Masunpatam, with some smaller rugs and pieces of furniture-tapestry, pretty effectually cover up Rothermel's Christian Martyrs, and other academy horrors. Here is a grand old carved German cabinet of the sixteenth century, and adjoining it a dark carved bookcase of probably a century later; a table decorated with inlaid brass by Boule, and a pair of richly wrought brass firedogs, both relics of Marie Antoinette's establishment; and a curious folding Italian armchair, constructed of narrow curved strips, exactly like Savonarola's chair in his cell in the convent of San Marco, Florence. There are also some pieces of old Spanish stamped leather, and some excellent examples of wrought-iron work.

The next gallery offers a rich display of pottery in all its variety, — one case filled with an interesting selection of Greek, Roman, and Etruscan ware, another with an equally valuable collection of ancient Peruvian ware; the other cases are filled with bits of Japanese earthenware and porcelain, Italian maiolica, Spanish and Moorish pottery, *grès de Flandres*, Limoges faïence, old English ware, and a few choice bits of Sèvres; in the remaining cases are some fine pieces of Laque, Chinese, Japanese, and Persian, while in the opposite case are a few very handsome bronzes, several of which we recognize as old Centennial friends; the central large vase bearing, in inlay relief of precious metals, an illustration of the story of the Japanese hero who fastened the golden tags to the storks' legs, and then set them at liberty, by way of testing the question of their longevity. In this gallery and the next, "Death on the Pale Horse," and the "Deliverance of Leyden," are temporarily in "quod" behind yards of maroon dry goods; as it was realized at a very early stage of the arrangements that the pictures and their frames would utterly destroy the effect of the museum objects.

In the corridor which connects this with the next gallery are arranged the Elkington reproductions in electro of objects in art silver work in the South Kensington Museum and other European collections. On an easel, beside a case filled with some very choice bits of ivory-carving, stands the reproduction of the Milton shield, while in the opposite case are a great number of curious small objects of silver, mostly antique, such as peasants' jewelry, archery prizes, etc.

Mr. Sommerville's collection of engraved gems and cameos occupies the whole of the next gallery, and offers abundant material for a special notice.

Among the laces and enamels which are disposed in the next gallery are some wonderful examples. Here is a necklace of the gold and green enamel of Perturbhar; and at the end of this room is placed the great silver vase designed by Chantrey, and presented to Charles Kemble by the citizens of London, on his retirement from the stage.

In the remaining room, the textiles are disposed in cases, and hung against the dreadful copies of the old masters, which constitute what is known as the Gilpin Collection. Here are the rich oriental pieces lately jointly purchased from the Castellani Collection by the Pennsylvania Museum and the Boston Museum of Fine Arts. A case containing some rich embroideries, and textiles in silk and gold of the sixteenth and seventeenth centuries, stands against one wall; facing this is a smaller case hung with some exquisite bits of Chinese costume; and in the centre of the room is a case arranged with some of the richest Russian, Italian, and Oriental fabrics in the piece: cloth of gold, Genoese velvet, gold, Florentine, and Venetian brocades, and Indian scarfs heavy with gold, are here piled together in almost cloying richness.

Considering the novelty of the enterprise, and the very conservative character of the average Philadelphian, there is ground for encouragement in this exhibition, if the fact of the institution being, or rather announcing itself as a school, as well as a museum, is constantly remembered and provided for.

The artistic furniture which during the Centennial Exhibition lent such attractive completeness to the interior of St. George's House (the headquarters of the British Commission) was sold under the hammer on Tuesday (16th), and realized very fair though by no means enormous prices; that the pieces should have even sold well during the present hard times, is very evidently owing to the prestige which their late position has given them, for they could hardly have been considered otherwise than as second-hand, having been in constant use, and some of the pieces pretty hardly used, ever since the opening of the Exhibition. The pieces were mostly the work of Messrs. Collinson and Locke, and Cooper and Holt of London. It will always be a source of regret to those who have seen St. George's House in its completeness, that this furniture should not have been bought by the city at the time that it became the recipient of the house, instead of shifting over to it the very commonplace furniture from the discarded Municipal Building.

On the first of the year the Supreme Court formally occupied the chambers prepared for it in the new Public Buildings. This has been regarded as a movement tending to secure a continuance of the work which as yet is far from complete, and an effort to head off an attempt which has been pending in the courts to have the work stopped, and consequently the taxes reduced; but on the 15th inst. the Supreme Court affirmed the decision of the lower court, and refused to enjoin the commissioners from proceeding.

The statue of Commodore Mead was the only one of the five which came to the Centennial to grace the Catholic Total Abstinence Fountain, and there he stood alone all that holiday time like an unrelieved sentry, over the group of marble rockwork at the head of the "Avenue of the Republic;" a day or two since, two of his tardy companions arrived from Antwerp, — Archbishop John Carroll and Charles Carroll of Carrollton; in another month "Father Mathew," the fourth of the minor statues, is expected. The colossal figure of Moses as the central object will then alone be required to complete the work. Herman Kirn is the sculptor, and the material is a hard white marble from the Tyrol. As to the artistic merits of the work there is very little to say except that it is big, and occupies a very prominent position.

Bell-founders will no doubt take considerable interest in the decision which may be rendered in the prospective St. Mark's bells case, which has at last made its appearance at court, the complainants asking for an order of the court to restrain and regulate the ringing of the bells. The bells of other churches in the city ring at the same hours, and chime and peal quite as often, but no such complaint appears to have been made elsewhere; still it is very generally the desire of both those in favor of and opposed to the "noise" to have the matter settled finally.

The report of the building-inspectors submitted to councils on Friday last, on the condition of the theatres and other places of amusement, contains a clause which is by no means re-assuring to the play-goer; it states that "there is scarcely more than one theatre" — the Academy of Music is evidently the one referred to — "in the city, that is provided with sufficient means of egress from its galleries in case of a panic, and but few with sufficient means of egress from the rear, and not one where just such a fire as lately took place might not occur among the scenes."

Among the numerous suggestions which have been offered with a view of suppressing the frequency of fires, it is odd that no reference should have been made to an excellent though seemingly severe precaution which is in force in Paris. The law there provides that the representative occupant of a house or apartment in whose quarters a fire commences is subjected to a heavy fine, he being considered quite as individually responsible for the safety of the premises as he is for the rent or taxes.

OBITUARY.

ASHER CARTER.

CHICAGO, Jan. 17.

LAST Sunday morning, the 14th, died at his residence in this city, Asher Carter, architect. Death came without premonition or warning. Paralysis of the heart was the cause.

Mr. Carter was born in Morris County, N.J., Jan. 25, 1805, and consequently had nearly attained his seventy-second year. He was the son of a carpenter, and followed that trade, building and designing his own houses, at Morristown, N.J., until 1849, when he was appointed to superintend the erection of the Second Presbyterian Church in this city, at the south-east corner of

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Wabash Avenue and Washington Street. This church was the first building of any architectural pretensions erected in Chicago. It was designed by James Renwick of New York, who had just completed Grace Church, and was then engaged on the Church of the Puritans on Union Square in that city. It was the first and only building erected in Chicago of the native prairie stone, which attracted so much attention, and had such a picturesque effect, from the fact that it was a white limestone impregnated with bitumen, which in warm weather would frequently run out of it. The church was destroyed — all except the main walls — by the great fire of 1871, and with a temporary roof was used as a wholesale clothing store for six months after the fire; but the property was soon after sold and the walls demolished. The land has not been built upon since.

It is remarkable that while this stone was never used for any other structure, the congregation of the Second Church rebuilt on another lot, at Twentieth Street and Michigan Avenue, with the same material, from plans made by Renwick, assisted by Mr. Addison, just twenty-three years after the first building had been commenced. Mr. Carter was asked to take the superintendence of the new structure, as he had done in 1849; but the already crowded work of the firm of Carter, Drake, & Wight, of which he was the senior partner, prevented this arrangement, and Mr. John Addison came on from the office of Mr. Renwick in New York, to take charge of the work.

During the erection of the old church, without having any definite purpose to become an architect, he employed his leisure time in making drawings for imaginary dwellings. These coming to the notice of members of the church and others, who in those primitive days of Chicago knew very little of the necessity of building ordinary houses from plans, he was employed to make similar drawings for them. Before the church was finished he found that he had grown into an architect almost without knowing it, being a natural offspring of the necessities of the time. Before this there was only one person professing to be an architect, — J. M. Van Osdel, who is still living, — and he had but a limited practice. With the very rapid growth of the city which dates from about this time, Mr. Carter's practice increased rapidly; and he was employed on all classes of buildings, many of them five-story stores, the wonders of the new city. In 1855 Mr. Carter took as a partner Augustus Bauer, now one of our most successful architects and vice-president of the Chicago Chapter. Carter and Bauer were for many years leading architects here, but at this time there were at least a dozen others. This partnership lasted until the beginning of the war. In 1864 Mr. Carter took as partner William H. Drake, who had been his pupil and assistant for many years. The firm of Carter & Drake was continued until after the fire in 1871, when P. B. Wight of New York joined the firm. Carter, Drake, and Wight practised nearly two years, and erected over half a hundred buildings in this time. On Jan. 1, 1873, Mr. Carter retired from the firm and the profession, and has since then lived in retirement, making frequent visits to the offices of his old partners, in whose success he has always taken a paternal interest.

In 1871 and 1872 he was a member of the Chicago Chapter, and Associate of the American Institute of Architects, from which he resigned on his retirement.

Mr. Carter was intimately associated with the architectural history of this city, having taken an active part in building and rebuilding it. He was not the architect of any very prominent buildings; but his practice was a private one, and his clients were the best and most respected citizens of the place. He never entered into a competition, and never solicited employment. He was conscientious in whatever he did to the last detail, and never asked or received a favor. The word "gentleness" describes the leading feature of his character. He never had an enemy, and no one ever spoke ill of him. He was respected and loved by all who knew him as an honest, upright, and faithful man, and a true type of Christianity. As an architect his whole life was an example, showing that one who is without greed, is scrupulous in his consideration for others, and independent and upright in his bearing toward all, cannot fail of success in every way; for he attained a substantial reward in a comfortable fortune of his own making, on which he was able to retire when he thought he had done his share of the work. But his greatest reward is the good name that he has left behind.

DRAINAGE IN LEVEL GROUND.

NEWPORT, R.I.

TO THE EDITOR OF THE AMERICAN ARCHITECT.

Dear Sir, — Mr. Henry R. Towne, in his communication on p. 14, instances the case of a house standing on level ground, such as prevails in the villages of Central New Jersey, and suggests the course to be pursued where the character of the surface makes it impossible to secure the requisite fall for the use of sub-irrigation drains. He supposes the case of "an ordinary house-lot, say fifty by an hundred and fifty." Let us suppose, by way of illustration, that the rear fifty feet of such a lot is to be used for the disposal of sewage by underground land-drain pipes. One of the conditions of the success of the system is that the slope shall not be too large. In arranging the sewerage of Lenox, Mass., where a large volume will be distributed, I have taken a fall of one in three hundred, or four inches to one hundred feet. For a private place where the wastes of a single household are to be accommodated, and where the flush-tank would not discharge more than from thirty to fifty gallons at a time, it would be better to have a fall of one in two hundred, or six inches to one hundred feet. More than this would be too much; and were the slope greater, I should propose to lay the lines on a course diagonal to the inclination of the land. The reason for this is, that if the inclination is greater, the flow runs too rapidly to the far ends of the lines, instead of leaking out more equally at each joint of its course.

To provide a fall of one in two hundred on the rear fifty feet of a level lot, would require a slope of only *three inches*, which could be made by the addition of an average depth of one and a half inches over the whole, requiring only about three hundred cubic feet of earth, — an amount less than the ordinary modifications in grade of any tolerably finished house-lot. Indeed, a part of the slope required could be given in the drains themselves, as there probably would be no disadvantage in making them a little more or a little less than twelve inches deep at their two ends.

I trust that this explains my statement that there is no practical difficulty in arranging for the application of this system, even on level ground. Of course provision must be made to deliver the soil-pipe, or the outlet of the flush-tank, at a point sufficiently high to reach these drains; but there is not the least difficulty in doing this. The question of cost, so far from being "ignored," is a leading argument in favor of the irrigation-drain system; for in no other way, even on level ground, can the problem be so cheaply solved.

Mr. Towne's suggestion for a leaching cesspool is simply inadmissible. I am confident that no sanitarian who has kept himself at all well informed of the progress of knowledge on this subject would permit the use of this device. The suggestions for the construction and ventilation of such a cesspool are practical and good in their way; but the objection to a cesspool is radical, and cannot be overcome. There are many conditions where, so far as the immediate occupant of the house is concerned, no harm may be done; and of course in the country, where the excavation is made at a distance from any probable future house site, there is less to be said against it. But in any congregation of houses in a town or village, the public authorities should strictly prohibit any such fouling of the earth. If the soil is so tight that there is no leaching, then, however loose the wall, there is no escape of the liquid. If through sand, gravel, porous strata, fissures in rock, or any other means of escape, the liquid soaks away, we may be quite sure that it will carry with it to greater and greater distances as time goes on, and as the soil becomes foul it will retain, the objectionable or dangerous ingredients. Deep down in the earth, away from the action of the atmosphere, we lose the effect of the cleansing oxidation of the air, and of the action of roots, which are the best agents in purifying all manner of sewage. In fact, the objection is a radical one.

We cannot safely retain on our premises a putrefying mass of organic filth; and our own safety and the safety of the community require that we shall not pour this filth into unknown subterranean recesses from which it may taint the water of wells and the ground-air under houses.

Mr. Towne suggests the cementing of cellar floors as a safeguard against the rising of foul air into the house. To accomplish this end such cementing must be absolutely tight, and the same tightness must be given to the surrounding wall. Both of these conditions are important to the best building, but they are often neglected for the sake of economy. So far as the drainage question is concerned, they would cost much more than would the adoption of the irrigation-drain system, even including the slight modification of grade that this might make necessary.

Mr. Towne asks, Why are we worse off with the exhalations from leaching into the deep soil (and under our houses) than with the irrigation system, where the whole of the decomposition takes place close to the surface of the ground?

Precisely because of the difference between a decomposition taking place in the absence of fresh air and roots, and the rapid and destructive process which these agencies insure. The most serious evils may result from the putrefaction of organic matters stored in large masses, or closely covered from the air. The same materials consumed by the concentrated oxygen of aërated earth, especially when an active vegetation stands ready to take up the results of the decomposition, produce no hurtful result.

Respectfully yours,

GEO. E. WARING, JUN.

FIRE-PROOF BUILDING.

SPRINGFIELD, MASS.

EDITOR AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — The Brooklyn disaster has naturally called forth a large number of suggestions and plans for improving the condition of buildings used for places of amusement; some wise and good, many foolish and bad. But the suggestions so far as we have seen, for new buildings, are for attaining only partial results. The impression seems to prevail that owners will not be willing to put

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enough money into their buildings to make them completely safe. It is upon this point that we wish to say a few words.

Several years since, we had occasion to thoroughly investigate the subject of making a theatre completely fire-proof, reference being had especially to cost. We found, somewhat to our surprise then, that the cost would not greatly exceed that of the ordinary construction then in use. This was however before the public had evinced the interest in such matters which the events of later years have produced, and before we had the experience which we have since acquired. Many of the methods then proposed were new, and though since used in other buildings with great success, were then experimental; and the owner finally decided for some of the partial results of which we have spoken.

Now many years of experience and the success of these very methods lead us to express the belief that a theatre building, which should be the safest of all constructions, *can* be made thoroughly fire-proof at a cost which will compare favorably with that of ordinary methods of construction. It is to be hoped that now the agitation will be kept up, till no committee will even think of putting up a schoolhouse, or any person a theatre or public hall, which will not be in every particular fire-proof. And if architects will show to their clients that the cost of constructing such buildings need not be so great as to deter them, we will bear them out whenever they refer to us. Very truly,

GEO. DWIGHT, JUN., & Co.

BRICK ROOFS.

LAWRENCE, KAN.

EDITOR AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — While in New York City last summer, I noticed that the deck portions of the roof of the Equitable Life Building were roofed with hard brick laid in cement. This is a new idea to me, but I find upon inquiry that it has been used in some parts of Ohio.

Assertions have been made here that the expansion of the bricks under the heat of the sun would be sufficient to break the cement, and thereby cause leakage.

I have experimented with some hard bricks, and at 120° Fahrenheit I find the expansion to be only $\frac{1}{64}$ of an inch in the length. Can any Eastern architects enlighten me upon the subject of brick roofs? Yours, etc., L. M. WOOD.

THE CATHEDRAL OF STS. PETER AND PAUL.

PHILADELPHIA, Jan. 17, 1877.

EDITOR AMERICAN ARCHITECT AND BUILDING NEWS.

Sir, — In the *Building News* for Jan. 6, your Philadelphia correspondent mentions the Roman Catholic Cathedral of Sts. Peter and Paul as having been designed by Mr. Le Brun.

I beg leave to state that the cathedral was designed by the late Mr. John Notman of this city, and the exterior, except the dome, completed under his superintendence; when, in consequence of a disagreement between him and his clients, he gave up the work. The interior of the building and the dome were completed under Mr. Le Brun's direction.

The store on Arch Street referred to by your correspondent (which I take to be No. 418) was also the work of Mr. Notman.

Respectfully, etc., M.

A JOURNEY OF AN ARCHITECT IN THE NORTH-WEST OF EUROPE. — II.

DUTCH COMPETITIONS.

"WHEN we had gone over Haarlem, we were invited to attend a very curious meeting, of which the reader will be glad to hear some particulars, for it was called for the purpose of deciding on a competition for the plan of a building; and there never was in France among architects a more *bona fide* competition.

"A neighboring town, wishing to erect an elegant fountain in a public square, asked for plans and tenders for the work. Several architects and sculptors answered to this appeal. The decision was made. Of course every one was very discontented except the successful candidate; but this was not all. Each of the others declared that the judges had not adhered to the conditions of the plan laid down, and that he had fallen a victim to the strictness with which he had observed the required conditions, etc., — such protestations and complaints as are always sure to be made in case of a competition, whether it takes place in Holland or in France, and which we have always known to recur on every occasion. Thus far there was nothing new; but at this point the novelty commences; for after the decision, the judges are expected to give a public account to the competitors of the motives which decided them, and which caused them to incline to the right hand or the left. This account was to be given at the meeting to which we were invited.

"It was a very interesting occasion. The competitors were numerous. Each one claimed the right of putting two questions to the foreman of the jury, who replied after having consulted with his colleagues. There could therefore be no decision with closed doors, no influence of party or position. A therefore could not give his vote to the son of B, on condition that B should on the next day vote for A.

"The questions proposed were of course clear, precise, expressed in very good terms, and with the calmness and good temper which a Dutchman always displays, and which requires a categorical answer free from circumlocution and subterfuge. It was not sufficient to say to an unsuccessful candidate, "I consider your plan a bad one;" for he demands immediately why and in what respect this judgment has been formed, and he has the right to expect an answer.

"Thus, having been closely pressed by one of the candidates, the president made the following reply: —

"'A programme cannot always be literally carried out: we must interpret the spirit of it. This is a matter of tact and judgment. Suppose, for example, it was proposed to study the arrangement of a floor of a building consisting of four rooms. Among those who send in plans, the first places his apartments behind each other. He fulfils the conditions, but the arrangement is bad. Another divides a rectangle into four parts. He also fulfils the programme; and yet his solution is no better than the former. A third, however, makes his four rooms independent of each other by means of a hall. His project is a good one. Would you accuse him of having violated the conditions because he has introduced another element, the hall, which was not specified? For my part, I should not hesitate to give him the preference; and it is a consideration of this nature which has caused the rejection of your plan. You have complied faithfully, but in a servile manner, with the conditions imposed. Another has understood and interpreted them better; he has been more intelligent and skilful, and has justified the preference which has been given to him.'

"There was no replying to this argument, as it was stated in so simple and moderate a manner; and, indeed, this mode of discussion, by immediately adducing an apposite example in order to render the demonstration more striking, is quite in keeping with the upright and practical disposition of the Dutch people.

"Why could not we follow this example? Is it not in accordance with our disposition? I see no reason, at least, that we should not try it; and if it should become a regular custom among ourselves for architects to be called upon to compete with each other, by supplying designs for public works, a plan much to be desired, it would be necessary, in order to encourage this innovation, to surround the decision with every possible condition of impartiality; and unquestionably the best means of effecting this is to give each candidate an opportunity, on the day following the decision, to ask the judge the reasons for his preference, without its being possible for him to refuse to reply, or to shelter himself behind the opinions of his colleagues as was the case at ——, where an unfortunate competitor showed, one day, letters of condolence received from his four judges, each throwing upon the others the responsibility of the decision at which they had arrived."

NOTES AND CLIPPINGS.

THE BROOKLYN MUNICIPAL BUILDINGS. — The inquiry in a late number as to who are the architects of the Brooklyn Municipal Buildings has been answered by the statement that Messrs. Ditmar and Mumford of Brooklyn are the authors of the design accepted in competition.

AGRICULTURAL HALL. — Agricultural Hall, at the Centennial, is to be taken apart and shipped to Spring Lake, near Sea Girt. Out of its wood and glass, a hotel, a railroad depot, and eight cottages are to be built.

FALL OF A BRICK CORNICE. — A portion of the cornice of an old and dilapidated tenement-house in New York fell on the 19th inst., and severely injured six children who were at play in the yard beneath it. The attention of the landlord had been frequently directed to the insecure condition of the cornice.

FALL OF A BUILDING. — A frame building 40 by 80, and 40 feet high, at Flint, Mich., partially finished, fell on the afternoon of the 18th inst., burying in the ruins four men who were on the roof, two of whom were seriously injured. The others were not hurt.

A NEW STEAMSHIP DEPOT. — The new depot which the General Transatlantic Company has been constructing at New York on the North River, at pier No. 42, is nearly finished. It covers a space of 541 feet in length by 75 feet in width, and is built in the shape of a tunnel. The vertical height at the centre is 40 feet. The storage-room is 32,480 square feet, and the capacity for freight is 18,270 tons, being 75 pounds to the square foot. The building is supposed to be entirely fireproof, galvanized iron being used for the most part. A water-conduit four inches in diameter runs its entire length from the quay to the western extremity, to which hose can be fixed. On the east side, fronting on West Street, stands a smaller structure, forty-five feet in depth, in which are situated the offices, including a telegraph-station. The exterior of this building is entirely covered with galvanized iron plating. A steam machine of seventy horse power is used to load and discharge the steamers. The building is entirely lit by gas, and the light is equally distributed through all its length by means of powerful reflectors suspended at a height of thirty feet. All the arrangements are well fitted for shipping purposes.

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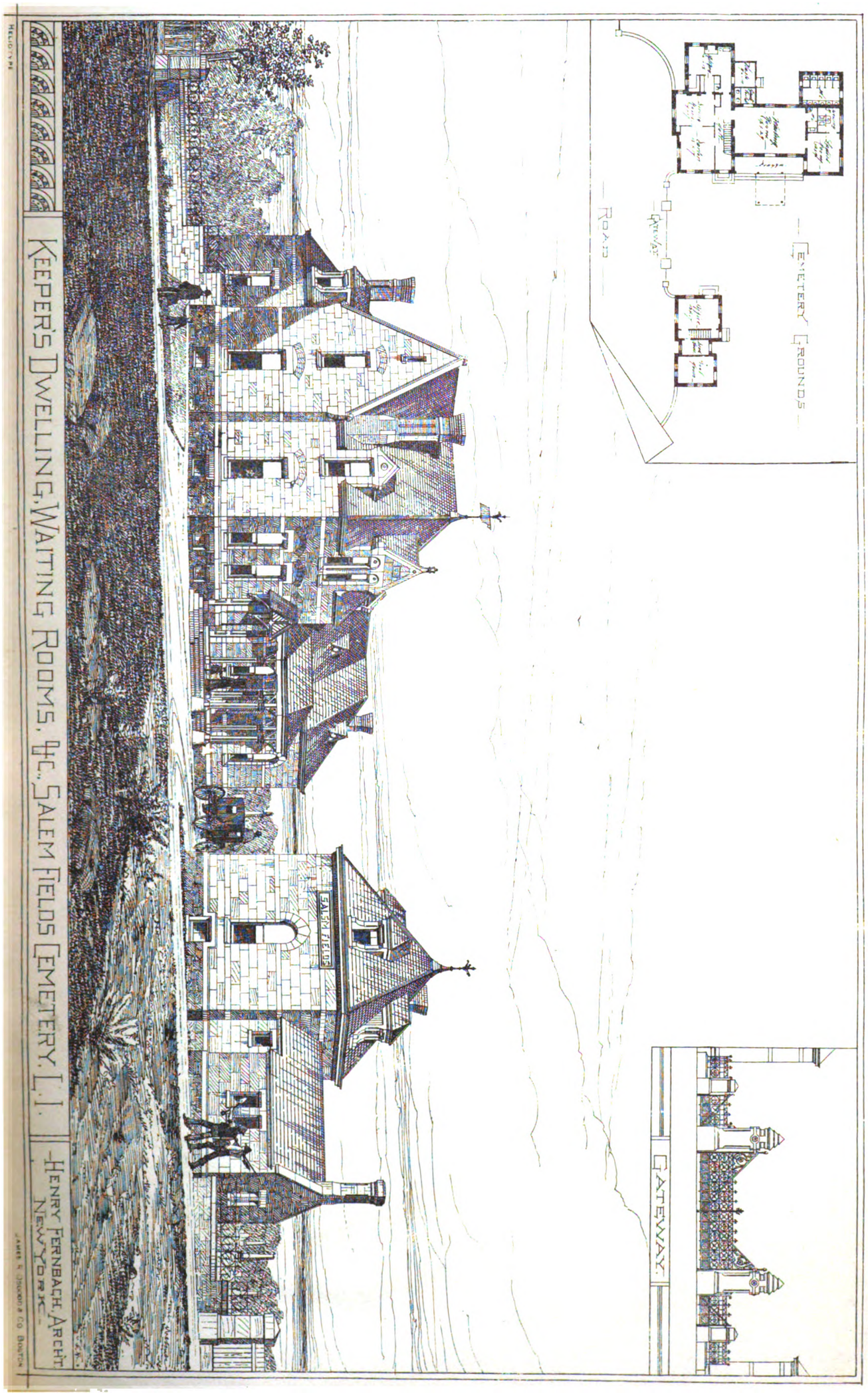

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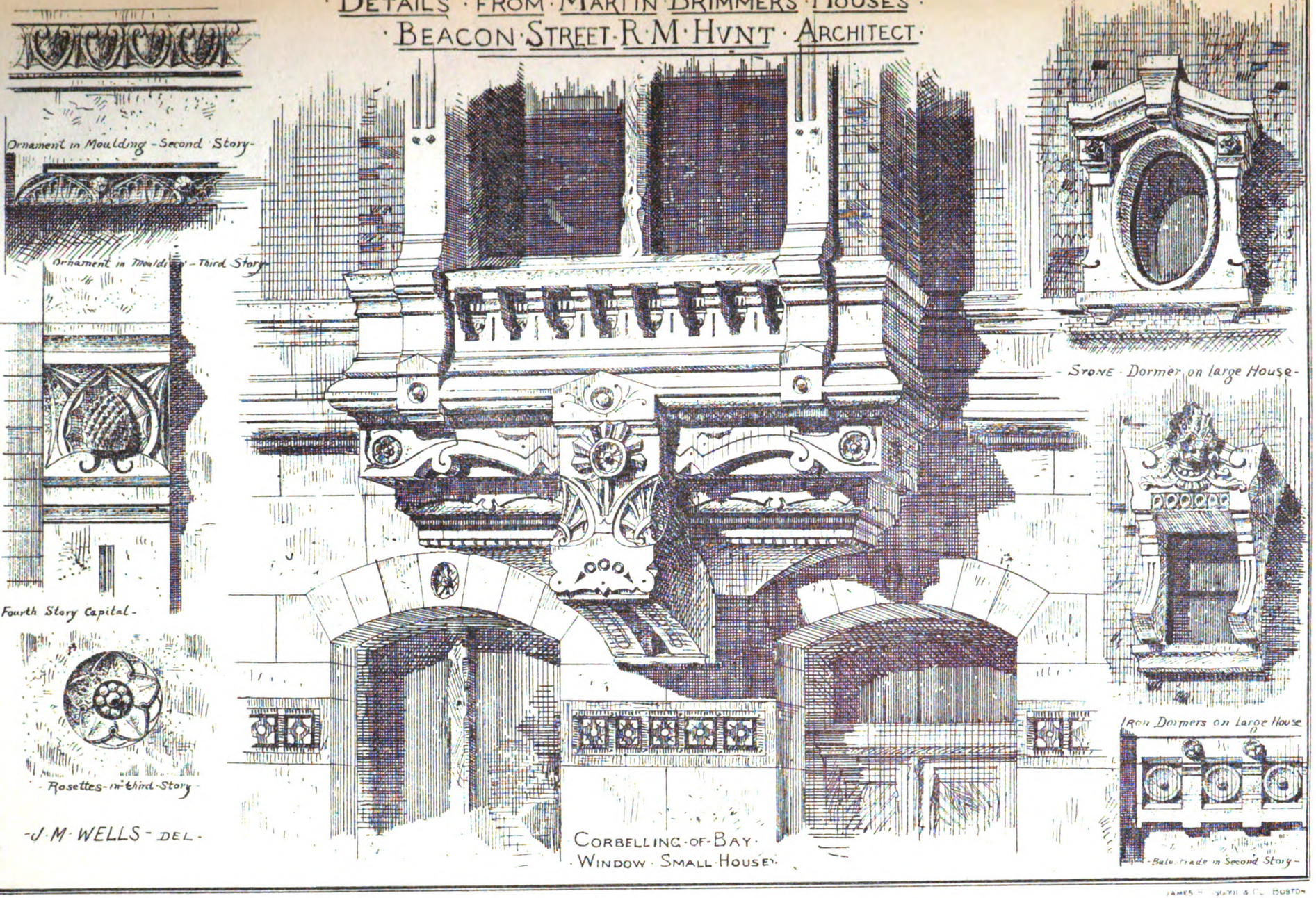

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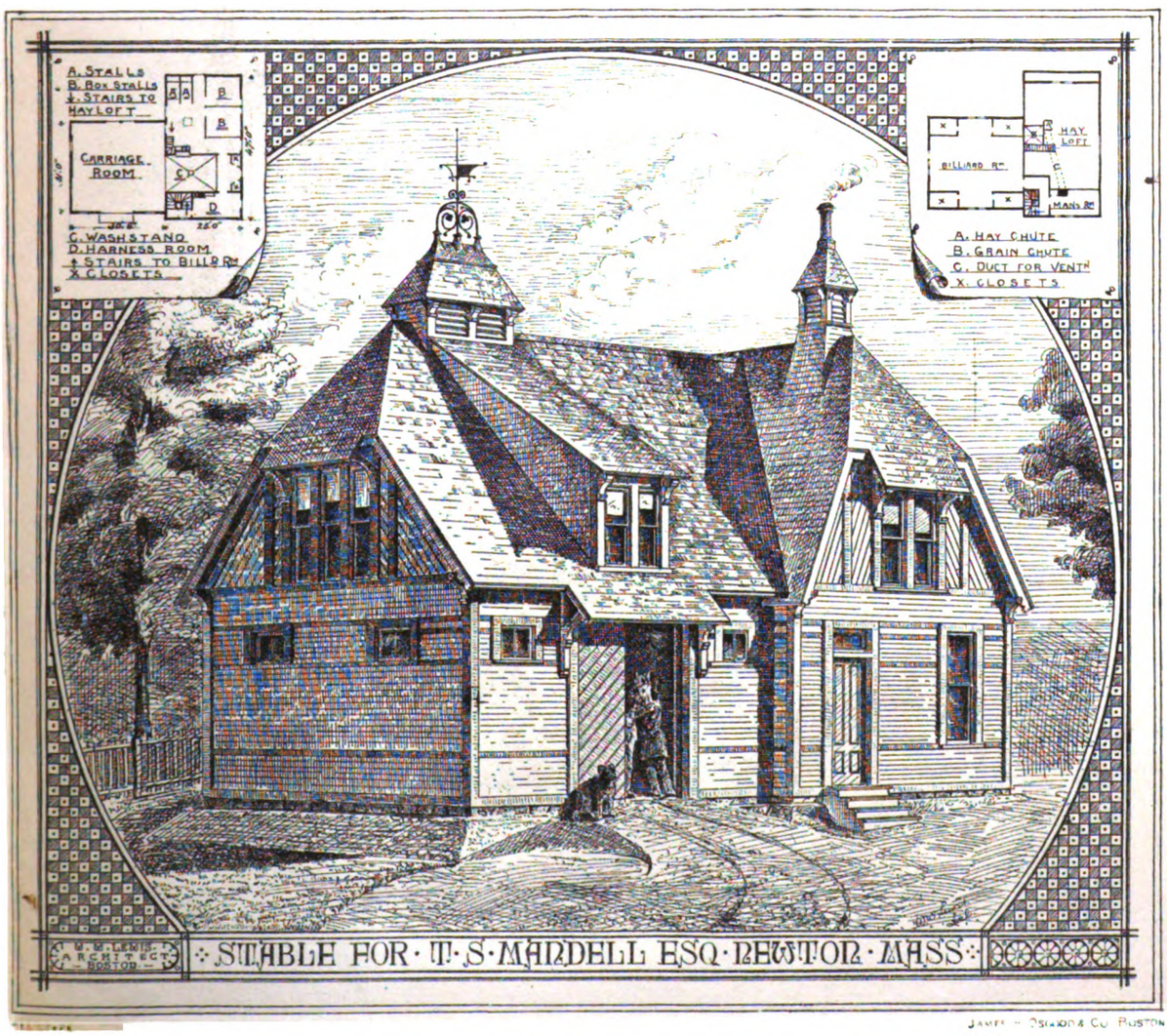

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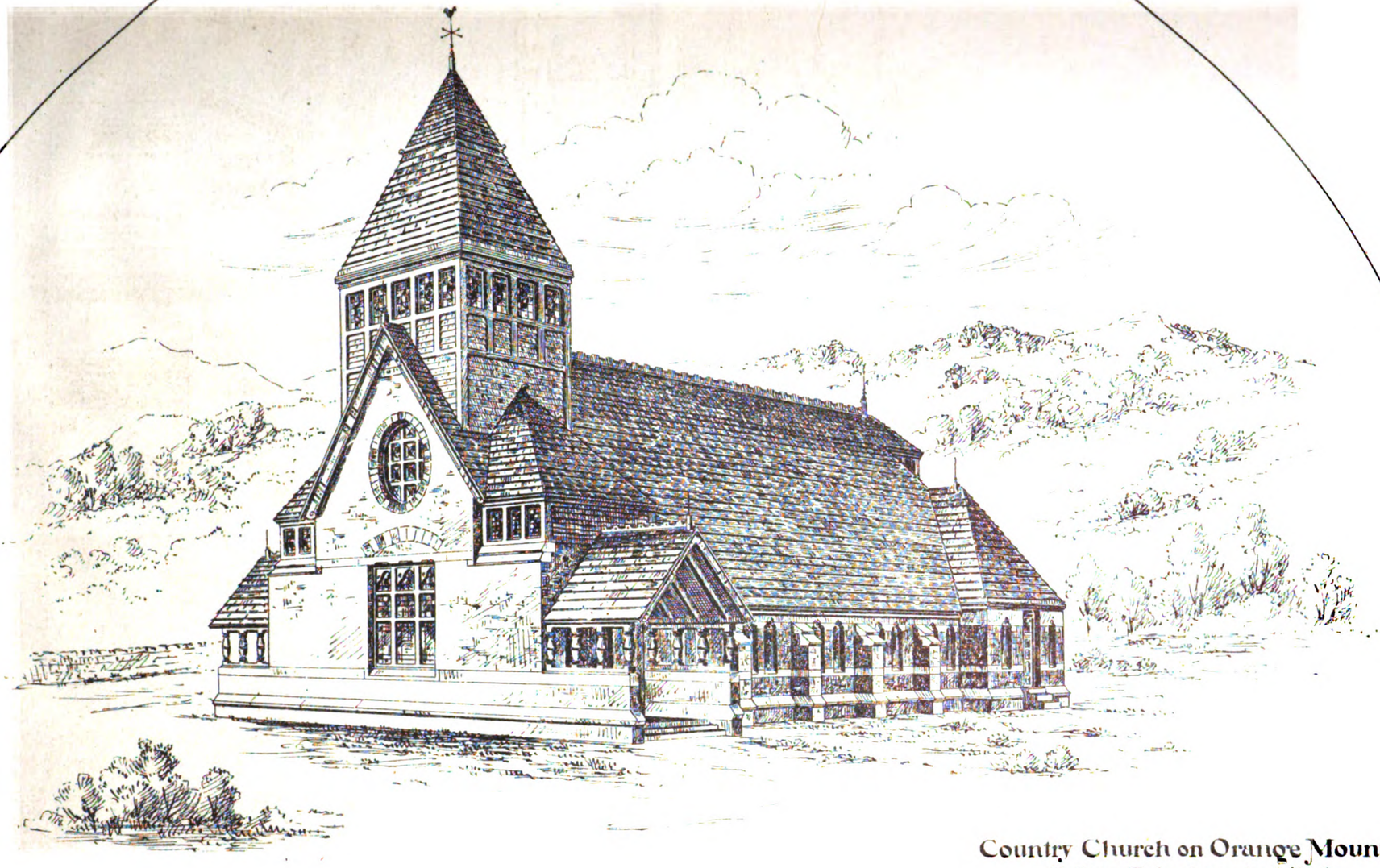

Country Church on Orange Mountain.

Potter & Robertson, Architects.

52 William St., N.Y.

H. Edwards Ficken, Del.

Heliotype

James R. Osgood & Co. Boston

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, FEBRUARY 3, 1877.

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THE Inspectors of Buildings in Philadelphia and the Superintendent of Buildings of Chicago have submitted reports of their examinations of the theatres and halls in their respective cities. In reading over the Philadelphia report we were convinced that sight-seers in that city must lead more precarious lives than in any other of the country; but the conviction was shaken when we read the report from Chicago. The Philadelphia theatres are noticeable for the large number of spectators that are seated in the upper galleries, and the provision of stairs is in many cases exceedingly niggardly. In the Academy of Music the upper tier seats 776; in the Grand Central Theatre, 1,000; in the Walnut-street Theatre, 800; the Arch-street Theatre, 700 to 800; Fox's, 1,000 to 1,500; the New National, 1,000. They seem on the whole better equipped with fire apparatus than those of Chicago, despite the pride of Chicago in its new water-works. The Academy of Music is one of the best planned for security in the country, perhaps quite the best. It is exposed on three sides, and has twenty exit-doors. A two-foot brick wall, running up through the roof into a fire-parapet, divides the stage from the auditorium; a similar wall separates the auditorium from the lobbies. The carpenter's shop and scene dock are also cut off by brick walls and iron doors. The stairways are in brick wells; the ceiling of the auditorium is framed in iron and plastered upon iron netting. There are no wooden partitions in the building, and no fires are used. The heating is by steam introduced from without, and the lighting by electricity. Each tier is emptied into its corridor by twelve doors, and each has its two independent stairways of good width leading to separate doors on opposite sides of the building; the dressing-rooms on the stage having also their independent staircases four feet wide on each side.

FOR difficulty of escape, on the other hand, perhaps Fox's Theatre bears the bell. Here the auditorium, which seats three thousand "but will accommodate five thousand," is sixty feet back from its only entrance. The floor of the house discharges nearly seven hundred people into a lobby eight by thirteen and a half feet, from which they escape into a main corridor thirteen and a half feet wide and fifty-two long, leading to the street. Into this lobby also the three hundred spectators from the first tier descend by two stairs of three feet four inches wide. Of the four or five hundred in the second tier, one half are brought by a staircase into the corridor of the first tier, whence they too are poured into the lobby below; and the other half are delivered by a separate staircase into the main exit corridor beyond the lobby. Finally, from one thousand to fifteen hundred from the third tier come down by a single stairway four and a half feet wide to join these on the equal staircase of the second tier; and the whole mass is brought together in the long corridor below. Other cases not greatly better are reported in Philadelphia. Among the first half-dozen theatres described in the Chicago report, we notice that three have absolutely no fire-plugs; one has seven water-buckets, one four, and the other none. In two the carpenter's shop is over the ceiling of the auditorium; in two, on one side of the flies. The theatres, if not so insecurely planned as the worst of those in Philadelphia, have very little to boast of. The lessons of the great fires seem to have been but little heeded in building them, and we do not read of any fire-proof construction. The general conclusion from all the reports that are rendered would seem to be that the theatres in the country which do not actually endanger their audiences might be counted on one's fingers.

THE accounts now given of the Strakosch Opera-House project differ materially, as was to be expected if it were to be carried out, from the first announcement. It is said that a lot has been bought for it in the block between Forty-third and Forty-fourth Streets and Madison and Vanderbilt Avenues, on which a building of one hundred and twenty-five feet by two hundred is to be built, Italian Renaissance in style, from the designs of Mr. Arthur Gilman. From the description that is given of the plan in the *Evening Post*, it appears that the lessons of the Brooklyn disaster are not neglected. It is promised that the building shall be of fire-proof material, with brick partitions, floors of iron and concrete, a roof of iron, with a metal ceiling over the auditorium, and stairs of iron and stone. There are also promised abundant exits in front and on the sides. The dimensions announced for the auditorium are identical with those of the theatre of La Scala at Milan, — one hundred and five feet deep from the curtain to the back of the boxes, eighty-seven feet wide from back to back of boxes, and sixty-five feet high. The arrangement of the auditorium, too, is essentially Italian, except for the standing-room in the pit, which we may assume will not be reserved. There will be five tiers of private boxes (at La Scala there are seven), making three hundred in all, of which a third are to be distributed by lot among the one hundred shareholders, leaving two hundred to the public. Behind the fifth tier of boxes, and looking over it, is to be an amphitheatre with seats for five hundred persons. On the floor of the house are to be six hundred and fifty so-called orchestra-stalls, which must of course occupy the whole *parterre*. The number of seats thus provided is about three thousand, — quite as many as can be satisfactorily placed in a theatre, perhaps rather more, but two thousand less than was at first proposed by Mr. Strakosch, according to the published account of his plan.

THE return to the European arrangement of separate boxes may be considered an experiment. These were introduced in older theatres of the United States as a matter of course, but were not found profitable, and have been almost universally given up in favor of the system of open galleries, which suited better with the simple ways of our people. How far the more luxurious habits of the present day will warrant a return to them, remains to be seen. A feature which we believe to be entirely new in American theatres is the introduction of rear-boxes, or rather small *salons* assigned to the separate boxes, after the Continental fashion. These are places of luxury for spectators when they wish to exchange the view of the stage and the audience for a quiet talk or an unnoted flirtation. But in the plan of the New York house, as we understand it, these *salons* are not arranged, as in the New Opera and one or two of the older theatres in Paris, directly behind the boxes and *en suite* with them, but across the box corridor, which therefore isolates them from the boxes to which they belong. This position, which is the customary one in the great theatres of Italy, leads there, we believe, to their being usually deserted, or used only as receptacles for cloaks and galoshes. We presume, by the way, that Mr. Strakosch no longer expects to open his house on the first of January, 1878.

WE have received the bulletins for November and December of the Metric Bureau, an association in Boston of persons who are interested in the adoption of the metric system, the object of which is to further the system by spread of documents which advocate and explain it; and by publications, public addresses, and direct solicitation, to push its claims wherever there is opportunity. We have also the report

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rendered to the Boston Society of Civil Engineers by the Standing Committee appointed to consider and press the adoption of the system in the United States, which gives facts and suggestions of interest. The committee record that the Diet of Sweden has voted to adopt the metric system, but very cautiously has postponed the date of its compulsory use to 1889. This is giving plenty of time for preparation, and for adapting the whole system of public instruction to its use; and means, in fact, to really accomplish the change before the time of compulsion. But the committee add that the reports of Swedish manufacturers and mechanics indicate that three or four years will bring the system into general use. Russia too, they say, is preparing to follow. By order of the society a circular letter has been addressed to a large number of societies in the United States, inviting them to unite in laying before Congress a memorial for the introduction of the system; out of twenty-nine answers received, sixteen were in favor of it, eight undecided, and five opposed.

THE fact seems to be that there is a gradual and steady, more or less unconscious, change going on in the minds of the people of the country, which is preparing them to in due time accept the change as a matter of course, and at last with comparatively little serious opposition, provided the movement is deliberate enough. That it will come sooner or later is hardly to be disputed, and it is likely that it will not take many years. The obstacles will be the inertia of people who know nothing or care little about it, and the active opposition of machinists and manufacturers who, as we took occasion to say some time ago, dislike it on account of the change it requires in their tools and machinery. We are told in the report that already the American Watch Company uses the metrical standard exclusively, and, what is a natural consequence perhaps, that the American Watch Tool Company does the same. A manufacturing company of Hartford, Conn., writes, "We think that if manufacturers would begin at once to make new tools, using the old until worn out, a change could be brought about with little loss and not much more trouble than is now experienced from variations in measures." On the other hand the Franklin Institute of Pennsylvania, though it believes in the adoption of a universal system, declined to favor a compulsory change, and adopted a report of its committee that the objections to the metre were "overwhelming." We infer that the Institute would have the mountain come to Mohammed, and the world adopt the foot as the universal unit. The American Academy of Arts and Sciences postponed the matter indefinitely. Meanwhile the movement in its favor is gaining a foothold in the schools and colleges, which is a great vantage-ground. It seems to be strongest in the East and in the West, and to find its chief opposition in the Middle States. The theoretical objections that are urged against it are mostly beside the mark. Thus the committee of the Franklin Institute and others argue that a decimal division of the foot would be more convenient, forgetting that the universal adoption of the foot is utterly hopeless. We read a short time ago in an English journal, a passage which was, we believe, a fair representation of the English conservative view, and which said among other things what has often been said, that for the daily uses of trade a binary subdivision was most convenient. This is true, no doubt, and that it is not incompatible with the decimal division is shown by our own division of the dollar. It was also argued, as is again common, that the decimal notation itself is as arbitrary as any other, and that in arithmetic a duodecimal notation would be much more convenient. This may be true, though we are inclined to doubt it; but it has nothing to do with the question. The idea that the world could be led at this point to give up the decimal notation, and adapt every thing to another, is chimerical. The only practical question is of the ultimate convenience of the change. Of that the best means of judging is the experience of those who have made it; and we do not hear of any nation that has done this and regretted it. It is doubtful if any perfect system could be devised; but it will be an immense advantage when a convenient system comes into universal use which not only adapts itself to the received notation, but includes a simple correlation of all the different units in use, whether in linear measure, square measure, solid measure, weights, or currencies; and at the point which the civilized world has now reached, there is apparently no hope of this but in the metrical system.

A SCHEME which has been more than once proposed, of heating a town by steam, is actually to be put into practice, it appears, in Lockport, N.Y. A Mr. Holly has arranged a plan for carrying steam to houses throughout the city in pipes, and supplying it to consumers like gas. A stock company has been formed to carry out the plan, and the experiment is to be tried in a section of half a mile square, that being the area which it is thought practicable to supply with one set of boilers. Estimates have been prepared which show, it is said, that the first cost of the works and pipes for such a district will hardly be more than a third of the cost of heating the houses in it for a year in the ordinary way. There can hardly be a doubt of the practicability of the scheme. Embarrassments will have to be met, — the loss by convection of heat from the pipes, the disposal of the water of condensation, and the like, — but no difficulties so serious as had to be overcome when gas was first introduced. Experience has shown that steam can be economically carried for considerable distances under ground; and Mr. Holly is convinced that in pipes wrapped with asbestos and enclosed in wood, it can be distributed without serious loss. The necessity of supplementary boilers is obvious, and it is doubtful, we should think, whether it would be found desirable to use the same supply, that is, the same pressure, for heating and for power; but these are questions of detail. Now that we have ceased to regard an open fire as any thing more than a luxury to be added to whatever unseen heating-appliance is our main dependence, the question of heat becomes exclusively one of convenience and economy. It is fortunately not likely that any convenient contrivance will again lead us to close all our chimney-flues as they were closed thirty years ago, and leave ourselves with only one string to our bow. If the experiment succeeds it will unquestionably become popular by virtue of its saving of household labor and dust in the management of fire, to say nothing of the likelihood that gradually means will be invented of using the motive as well as the heating power of steam for household services. There is the danger that a people who, in spite of the doctors, do not much wish to be ventilated, will be tempted more than ever to condemn themselves to close houses; but we have a powerful antidote in the present temper of physicians and other "sanitarians," and the people who have a Malthusian dread of the exhaustion of coal and petroleum will gather comfort from any thing that promises to spare our supply of fuel. On the whole we may be thankful to anybody who has the spirit to try for us so interesting and so promising an experiment.

METHODS OF VENTILATION.

[Report on Methods of Ventilation, read at the third Annual Convention of the American Public Health Association at Baltimore, by Carl Pfeiffer, Consulting Architect of the Health Department, New York.]

Mr. President, — In reporting upon the systems of ventilation, I have endeavored to obtain the results of experiments and experience of men of undoubted authority, such as Prof. Pettenkofer, Dr. Grassi, Peclet, Morin, and many others.

While much ingenuity is exercised, and the means employed to accomplish ventilation are various, the systems upon which they are based are known first as that of natural or spontaneous ventilation; second, of ventilation by aspiration or extraction; and third, that of propulsion or mechanical ventilation.

Natural ventilation is based upon the difference of the outer and inner temperature, and consequently also upon density of the interior and exterior air. To produce a sufficient velocity in the evacuating and supply flues so as to insure an efficient renewal of the air, the difference of temperature must be considerable. The primary force which produces motion in spontaneous ventilation is the difference of specific gravity of two columns of air. In the same degree that this difference of temperature is lessened between the inner and outer air, the velocity of the current will be reduced. Should the exterior air be equal in temperature to that of the interior of a building, no movements of air will take place.

Degen (*Handbuch der Ventilation und Heizung*) states that by a difference of from 30° to 40° a sufficient ventilation may be secured; a result that may be obtained in winter, but not in the spring, summer, or fall. "In these seasons," the same author says, "the system of natural ventilation has been found to be insufficient; and if a constantly operative ventilation is required, it will be necessary to employ mechanical means to secure it." It seems necessary in these seasons to employ machinery to set the air in motion: the

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opening of windows will not be sufficient. Pettenkofer found that through a window-opening of 9½ square feet, a supply of only 14 cubic mètres of air was received during one hour, and by the entire open space of an ordinary window, the requisite quantity for two persons only could be obtained (60 cubic mètres per hour being considered necessary for one person). To demonstrate how variable the results are of natural ventilation, I need only refer to some of the experiments of Dr. Pettenkofer made during the months of March, October, and December. At 19 different trials he found the changes of air in the same room, of which he was the only occupant, to vary from 69.3 to 1009.8 cubic feet. In the former case there was no difference between the exterior and interior temperature, while in the latter the difference was 19°. In addition to the above Pettenkofer made 220 experiments in the Lying-in and in the General Hospitals at Munich, by request of the Bavarian Government. The ventilation of these buildings was based upon the natural system: he found during 100 experiments that it was entirely inoperative, and during 100 other experiments the action in the flues was the reverse of that which it was intended they should have.

This then seems to demonstrate the insufficiency of the system where a permanently active change and an unvarying supply of air are required, as in hospitals, asylums, prisons, schools, etc. In connection with this system, I wish to add yet that the velocity of the current of the exterior air exerts a marked influence upon the ventilation of a building, as it has been found that much more fuel and heat is required when it is cold and windy, than during calm cold weather.

The second system is that of aspiration or extraction. This system has perhaps nowhere had a fairer trial than at the Hospital La-Riboisière at Paris. This hospital was completed in 1854. The authorities, being very desirous that it should be well heated and ventilated, prepared a programme containing the conditions which should be fulfilled by proposals which were to be invited. The programme according to Dr. Grassi (*Étude comparative des Deux Systèmes de Chauffage et de Ventilation établis à l'Hôpital La-Riboisière*), contains the following thirteen conditions: —

1. A constant temperature of 15° in the wards during the whole year by day and night.
2. A temperature of 15° during the whole year, in the daytime only, in the offices and rooms.
3. A temperature of 10° the whole year by day and by night on the stairs of the pavilions of the sick.
4. A constantly operative ventilation by warm air in winter and by cold air in the warm season: the supply of fresh air to be at least 20 cubic mètres per hour and per bed in the wards.
5. A ventilation during the daytime only, of 10 cubic mètres per bed in the private rooms of each pavilion.
6. A ventilation in the water-closets sufficient to prevent under all circumstances the development of bad odors, and without creating currents which might prove injurious to the patients.
7. The ventilating apparatus to possess a surplus of power sufficient to produce in some or all of the wards, twice the amount of ventilation before prescribed, in case it should be found necessary during a great epidemic to increase the number of beds.
8. The ingress openings of the fresh-air flues to be of sufficient transverse section to admit the air into the wards with but little current and at a temperature not exceeding 70°.
9. The air must enter the wards in the requisite degree of moisture, susceptible however of being changed at pleasure.
10. An especial contrivance for cooling the air artificially when necessary during seasons of great heat.
11. The apparatus for the general heating, or special apparatus, to furnish a sufficient quantity of warm water to answer all requirements of the wards, and to maintain an efficient temperature in the hot-closets of the ward kitchens.
12. In every kitchen of the basements, either in connection with the warming apparatus of the kitchens of the upper stories or separately, provision must be made for maintaining an active fire.
13. The heating and ventilating apparatus to be contrived so as to admit of being gradually put in operation in all parts of, or to be discontinued in any portion of, the buildings; besides, the apparatus must permit the lowering or raising of temperature of the wards.

A commission composed of scientific men of accepted authority, and presided over by the well-known physicist and chemist Régnault, examined the various proposed plans and methods, and decided in favor of forced or fan ventilation, as proposed by Thomas and Laurens of London. This decision created a general dissatisfaction and strong opposition. This method had not been in use in Paris. The system of aspiration so well contrived by Léon Duvoir had produced favorable though not entirely satisfactory results; but its advocates so strongly attacked the decision of the commission, that a second one was formed, composed mostly of architects under the presidency of Gen. Morin. The latter made the proposition, assented to by his associates, to heat one half of the number of pavilions by the system of aspiration as proposed by Léon Duvoir, and the other half by the system of propulsion as proposed by Thomas and Laurens. The demand upon the ventilation was increased from 20 to 60 cubic mètres per hour and bed for both systems.

It has been conceded that the operation of these two systems was investigated in a most thoroughly scientific and impartial manner by Dr. Grassi during a period of two years. In the experiments of the system of aspiration he put to himself several questions which in the opinion of Pettenkofer were answered with scientific precision. Among these were first: Is the amount of air which passes through the extracting chimney equal to the amount of fresh air supplied by the flues intended for this purpose? By measuring with the anemometer he found that 93 cubic mètres of foul air passed through the chimney per hour and per bed, while only 31 cubic mètres of fresh air came in during the same time through the fresh-air flues instead of 60 cubic mètres as prescribed, and the difference of quantity was supplied by the doors and windows.

Dr. Grassi found during various experiments an analogous result. Question second: Is the system of aspiration uniform during the entire year?

The result of his experiments obliged him to answer this question most decidedly in the negative. The motive power being the difference of temperature of the extracting chimney and that of the open air, and as this difference was at times more, and at other times less, so also he found the ventilation to vary. Consequently the system of aspiration was declared by Dr. Grassi to be faulty and insufficient.

In connection with the system of aspiration the construction of the ventilating shafts, flues, and chimneys is of great importance. I have learned by experience that it is not sufficiently observed by people who have such matters in charge, whether the movements of air are produced by static pressure or by suction.

It is ultimately the general pressure of the atmosphere which produces the movements of air, whether in consequence of the disturbed equilibrium, or by a vacuum created by suction. A chimney-flue does not act as a bellows; and the general expression "suction of the air" by means of a chimney, shows most unmistakably the erroneous conception of aërostatic laws by laymen in physics. Physicists have furnished the most decisive proofs that the so-called draught in a chimney is not produced by the tendency of the warmer columns of air to rise within it, but by the pressure of the colder lower strata of air; for the same reason that causes oil to rise in the water.

The third system, that of propulsion, being in use in the other half of the La-Riboisière Hospital buildings, was submitted to the same careful test by Dr. Grassi. While the programme demanded a supply of only 60 cubic mètres per hour and bed, he found that in the pavilion nearest the fan 132 cubic mètres were furnished per hour and bed, in the second 126 cubic mètres, in the third and last 88 cubic mètres were furnished, or an average supply of about double the quantity demanded.

Grassi tested also the barometric pressure of the air in the wards in comparison with that of the open air, and found the former less compressed than the latter, so that considerable additional air passed into the wards by the joints of the windows and doors. Notwithstanding the excessive supply of air, no draughts or unpleasant currents were perceptible a few feet from the openings.

It was also found that in the wards ventilated by this system the carbonic acid was only 11 per thousand, while in the former it was 2.5 per thousand of the volume of air.

Dr. Pettenkofer, who was commissioned by the Bavarian Government to examine the ventilation in use in the public buildings in Paris and London, has verified the conclusions of Dr. Grassi, and states in his report that the experience and tests made at La-Riboisière were perfectly convincing as to the superiority of the system of propulsion or mechanical force in ventilation, and recommends it as the only reliable method.

As it has been a point of considerable dispute and discussion, whether a fan should be placed so as to extract the foul air, or to force in the fresh air, Dr. Pettenkofer gives the results of experience as well as investigation of this matter at the Hospital Beaujon in Paris. Here the fan was originally placed in a chamber in which all the foul-air flues terminated, and contrived so as to extract the foul air, leaving the supply of fresh air to take care of itself. This however proved a complete failure, and it was found necessary to change the position of the fan, and reverse its operation so as to force in fresh air.

Dr. Pettenkofer closes his report with the opinion that the natural system of ventilation is irregular and accidental, and not to be recommended. As to the system of aspiration, he says that it cannot be denied that a good ventilation may be attained by it, but it is more or less irregular, and will vary with the difference of temperature in the extracting chimney and that of the open air. He refers to Peclet as having given the clearest and most convincing proofs of this in his report of the ventilation of Mazas Prison. He concludes by recommending forced ventilation as the only reliable method, inasmuch as the requirements of our lungs are constantly the same, that it is our duty to employ the means by which we will insure the supply of this demand. He says that it is of the utmost importance to furnish a sufficient supply of fresh air, and when this is done but little attention need be paid to the expulsion of the foul air.

Peclet, who devoted a lifetime to the study of physical science, who has sometimes been called the father of the new science of

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applied physics, and whose works are perhaps the most authentic on every thing that appertains to the phenomenon of heat, has expressed almost the same views as Dr. Pettenkofer. (The views of Peclet have been cited in Dr. Parke's "Practical Hygiene.")

Gen. Morin in his latest work upon heating and ventilation gives the results of investigations in these matters in several of the manufacturing establishments of Paris, where the atmospheric impurities produced were very great, "as showing that the recent trials seem to demonstrate that the system of ventilation by propulsion was the most effective." A German author in reviewing Gen. Morin's work, and noticing this passage says, "The advocates of this method could not desire a better method than this, as it comes from a hitherto most strenuous opponent of that system."

Dr. Seifert of Dresden, to whom was awarded the first prize by the Imperial Academy of Vienna for an essay on the construction of Asylums for Insane, and who visited the institutions of Germany, France, England, and other countries, arrived also at the conclusion that mechanical ventilation was the most perfect.

The convention of Superintendents of American Asylums for Insane declared by resolution in 1851, and re-affirmed the same in May, 1853, that forced ventilation or the use of a fan was the only method to be recommended for their institutions.

A number of eminent English authors have advocated the same method, and I might name yet a considerable number of authorities; but I trust I may have stated sufficient to elicit a profitable discussion of this subject.

THE ILLUSTRATIONS.

TRINITY CHURCH, BOSTON, MASS. MESSRS. GAMBRILL AND RICHARDSON, ARCHITECTS.

(57 Broadway, N.Y.)

THE new Trinity Church in Boston stands on the so-called Back Bay, a district entirely of made-land: in consequence, the foundations were unusually costly. The structure rests on 4,700 piles driven to a depth of 15 to 35 feet, and the foundation extends from the water-line to the sidewalk 13½ feet. The four piers which carry the tower are supported each on a solid pyramid of block granite from the water-line to the church floor, the four pyramids together containing about 40,000 cubic feet of masonry, all laid in Portland cement. The piers themselves are of cut granite, and the arches which carry the superstructure of brick in cement, tied with iron rods at the springing.

The general arrangement of the plan is suited to the shape and position of the lot, the church closing the vista of two important streets and having its longest frontage on a third, so that the central tower has the advantage of belonging equally to each elevation, and hence, so to speak, all the sides are fronts.

The floor of the church accommodates one thousand persons, and the three galleries, one in each transept and one across the west end of the nave over the vestibule, will seat 450 more, making the total seating-capacity 1,450; but some additional room can be had on occasion by putting seats in the north-east vestibule and the room above it, both of which open by wide arches into the auditorium. The chancel is furnished with stalls around the apse, the altar standing in the middle, with an aisle all around. The chancel floor is raised five steps, with an additional kneeling-step at the chancel rail. The organ occupies the room at the south side of the chancel, the manuals being in the transept gallery, or rather in a small special gallery opening out of it; and the choir will be placed near by.

The walls are faced with broken-range quarry-faced granite of a light salmon color and very fine grain, from Dedham. In places where large stones were required, the red granite from Westerly, R.I., was substituted for the Dedham, the latter not usually quarrying in pieces more than two feet in any dimention.

The belts, jambs, and cut-stone generally, are of brown freestone from Longmeadow, Mass., from two quarries; one, of very hard stone, being resorted to for lintels, steps, and other parts subject to special wear or strain. The tower roofs are covered with red tiles from Akron, Ohio; and the hip-rolls and crockets were executed by the Chicago Terra-Cotta Company. The vestibules and so-called "cloister" passage-way between the church and chapel are to be paved with encaustic tiles from Maubeuge, France. The windows now in the building are intended for temporary use only; most of them will be ultimately replaced by memorial windows, a large part of which are already in the hands of London and Paris artists.

All the interior is furnished in black walnut, the furniture, though massive in style, being enriched with carving.

The decoration of the church, to which more space may hereafter be devoted, has been intrusted to a distinguished artist, Mr. John LaFarge of Newport and New York, who has, by giving an important place in his scheme to figure-subjects, opened a new and interesting field for our future designers of monumental structures.

The plan of the church seems to be favorable for acoustic qualities, the semicircle of the apse re-enforcing the speaker's voice, and the galleries across the flat walls precluding any chance of echo.

The roof is furred so as to form a kind of cradle vault, but of a trefoil section, the tie-beams of the trusses crossing the trefoils at the cusps. The lower part is therefore furred out from the wall, the windows rising above the spring of the arch and forming lunettes. The same treatment continues around the chancel. A font of marble and alabaster presented to the church stands in the chancel.

The church has been some four years in building; and it is worthy of notice that after a contract of nearly three years and a half duration, the building was delivered to the society on the appointed day.

IRON STAIRS. N. POULSON.

(Peck Slip Iron Foundry, 130, 132, and 134 First Street, Brooklyn, E.D., N.Y.)

Fig. 1. Circular stairs with cast-iron or slate tread. Fig. 2. Twin stairs for library, office, attic, roof, cellar, etc.: they only occupy half the space of ordinary stairs, and will serve as substitute for small circular stairs, as they are much more pleasant to ascend, and can be made at less cost. Where the height is not too great, the whole (without the hand-rail) can be cast in one piece. All the risers except the first and last are made twice the usual height. Figs. 3 and 4. Stairs with iron strings, risers, and balusters, hand-rail of hard wood, treads of slate or marble, or cast-iron treads made to receive ornamental tile, cement, or wood; the treads of stairs can be made of the same material as the floor and platform, so as to correspond with them and still be kept fire-proof; all treads are so constructed as to be easily replaced when worn out. The balusters and ornaments may be japanned instead of painted; and in many cases bronze electrotype medallions, panel ornaments, &c., can be used without much additional cost. Stairs like Figs. 3 and 4 can be built of iron at a cost not much exceeding those built of hard wood.

UNITED STATES COURT-HOUSE AND POST-OFFICE, LITTLE ROCK, ARK. MR. JAMES G. HILL, SUPERVISING ARCHITECT OF THE TREASURY DEPARTMENT.

Congress has extended the limit placed upon the cost of this building to $100,000.

AMERICAN INSTITUTE OF ARCHITECTS.

BOARD OF TRUSTEES.

MEETING held at the Institute rooms on Thursday, Jan. 18, 1877, at two P.M.

. . . . . .

The Secretary presented letters from Toronto and Hamilton in Canada, in relation to the formation of architectural societies, and was directed to correspond with such inquirers in his discretion.

The Secretary presented several letters in reference to architects' claims under the lien law, and was directed to communicate with the Chapters collectively as well as with each professional member of the Institute individually, with a view to obtaining all the information possible as to adjudicated cases, bearing on the emoluments of architects, through the operation of lien laws or otherwise.

. . . . . .

The question of quarterly meetings of the Board for the current year, referred to this meeting from the last one, being taken up, it was on motion of Mr. Walter,

Resolved, that quarterly meetings of the Board of Trustees be held at the rooms of the Institute on the first Thursday of March, June, September, and December, at two P. M.

. . . . . .

Mr. Pfeiffer moved that the Secretary be directed to request each Chapter to prepare for the next convention of the Institute a paper on the building-materials of its section. Carried.

The Secretary was directed to write to the Bureau of Topographical Engineers for public documents relating to architecture and engineering, for the use of the Institute.

The meeting then adjourned.

PRISON CONSTRUCTION.

WE have received a volume of some eighty pages, with numerous illustrations, upon prison construction as patented by James B. Cook, architect, and James W. Heath, engineer, of Memphis, Tenn.

Their inventions consists in the method of construction of prison-cells, in the application of cast iron to this purpose, and in the expedient of surrounding the cells of a prison with sand or other mobile filling, with which is connected an automatic alarm system. They claim that by their system of construction, their cells may be used in an inexpensive brick building, and yet possess the necessary security. Their plan of a county jail represents a simple two-story brick building, the first story of which is occupied by the jailer and his family. The cells are placed in the second story along the two sides, with a common passage between them, each cell having a window to the open air. The cells are supported upon a solid floor of wood joists laid side by side, and resting upon the walls and partitions of the first story. Their patents include three forms of construction. For station-houses, insane-asylums, etc., where great security is not required, the cells are built up of

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several thicknesses of oak or other hard wood plank, put together in layers, crossing each other and spiked with wrought nails. For these cells they use their patent cast-iron doors and window-guards, set in cast-iron frames. We think the use of wood in prison construction is a great mistake; nothing that will burn should be used. A prison-cell lined with plank in this way would soon become a nest for vermin, which the cracks and joints in the plank would make it exceedingly difficult to prevent.

For small county jails where greater strength is required, in connection with this system of wood construction, the sides, ends, and top and bottom of the cells are lined with cast-iron plates one inch thick, two feet wide, and in lengths equal to the dimensions of the cells. These plates are ingeniously secured together by means of grooves and rebates made in the castings, so that each plate is let into and secured to its neighbor. Where bolts are necessary, they are used in flanges cast on the outside of the plates, and not accessible to prisoners from the inside of the cell. The window-frames are made very strong, and cast with grooves for the window-guards and with flanges to take the brick or stone work of the outside walls of the building, and the cell lining and wood backing on the inside. The door-frames are constructed in a similar manner; both are built into the cell construction as the work goes on. The window-guards are simply cast-iron plate tracery three inches thick, with openings or voids arranged in a geometrical pattern, and filling a little less than one-half the area of the window. The doors are similarly made of plates of cast iron, with openings at the top and bottom for the circulation of air. Lock sockets or bolsters are cast in the metal, in which the locks are secured. This is a precaution against jail raiders from outside the building, to prevent the locks from being taken off from the doors.

For larger jails and where greater security is required, Messrs. Cook and Heath have invented a very novel expedient indeed. They make their cells as before, but with an air-space all around, and at top and bottom some six or more inches in width. This space is filled with sand from above after the cells are set up. Over the top of the upper tier of cells is a hopper or bin, in which a supply of sand is placed. In some cases the space for sand-filling is formed by a double thickness of cast-iron plates all around the cells; in others the wood backing forms one side of this space. The object of this sand filling is twofold, — to astonish and perplex the jail-breaker with an avalanche of sand if he attempts to cut through his cell lining, and to set in motion an automatic system of alarm. This alarm consists of weights placed in and on the sand and connected with the jailer's office. The theory of the inventors is, that any attempt to cut through the walls of the prison will set the sand in motion, displace the weights, and sound an alarm. The prisoner in spite of himself thus gives notice of his intention to leave.

This form of construction for small jails seems to us complicated and expensive; and we doubt whether it would prove very secure. Why should these cast-iron cells be built in the second story of a building upon a wooden floor, and be strengthened and backed with wooden bulk-heading? Why not rather put the cells in a wing of the building upon a solid support of brick or stone, and fill in and back up the ironwork with brickwork? The cells would be easier to build, quite as strong, and we think cheaper. As to the security of these cells, built with windows to the open air, we are sceptical.

Jail-breaking has been developed into an art. Messrs. Cook and Heath give Boston the credit of an association of thieves and jail-breakers devoted to the study of this subject. With the clever tools which have been contrived for the purpose, a prisoner could in a few hours drill and cut out a section from one of the cast-iron window-guards large enough to let him out. Let us suppose, however, that the window guards are made of chilled iron or some combination of metals which is drill-proof; the prisoner would then probably attack the cell lining just under his window-sill, where there would be no pressure upon the sand. By drilling a few holes close up under the sill, and by injecting a little water, the sand would be rendered sufficiently stable for his purpose. By cutting out a piece of the cast-iron plate here, he has then only to go through the wood backing and the brick wall, and he is out. It is assumed that the prisoners are not able to get the proper tools. They do nevertheless get all sorts of tools, in spite of the care and vigilance of the officers. We have seen a collection of large and formidable tools taken from the prisoners of the Massachusetts State Prison, such as saws, files, drills, jack-screws, iron bars, and the like.

If this system of construction were applied to large penitentiaries upon the Auburn plan, with three or four stories of interior cells, it would, we think, be complicated and expensive. In the absence of data we can only judge of the cost of this kind of work by the Shelby County Jail of Tennessee, built by Mr. Cook. The jail contains eighty cells, five feet by seven feet, and eight feet high. The total cost of the building was two hundred and sixty-four thousand dollars, — or three thousand three hundred dollars per cell. We think this is a high price.

Messrs. Cook and Heath also claim patents for the construction of safe deposit vaults upon their system, depending largely upon their automatic alarm for safety, which in such cases is worked by electric attachments.

We think an expert burglar would make short work of the cast-iron plates; and the use of water and any of the refrigerating mixtures would probably render the sand quiet. We commend the study of the use of welded steel and iron in plates and bars as a much stronger material for this sort of work. Since, however, the inventions are actually in use, experience will be the best test of their value. It will be interesting to learn how secure they prove in practice; they certainly are ingenious.

CATHEDRAL OF STS. PETER AND PAUL.

24 PARK PLACE, NEW YORK.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — I was much surprised at the communication of your anonymous correspondent "M." from Philadelphia, which you published in your last number. His communication would imply that the design of the Cathedral of Sts. Peter and Paul in Philadelphia was due to the late John Notman, and that I merely "completed the interior and dome in consequence of a disagreement between him and his clients."

This is altogether a distorted perversion of facts. The actual plan of the building, with the omission of an apsidal termination to nave and transepts (unfortunately never constructed), is identical with my original design made in 1846, — in September of which year I supervised the laying of the corner-stone, and continued to direct the work until 1851.

A disagreement between myself and clients then caused a suspension of my connection with the building for several years, during which time the present façade was erected (and very poorly too, as numerous fissures testify) according to an amended design by Mr. John Notman. This was his sole connection with the work.

Upon the dismissal of Mr. Notman in 1857, when the walls of the balance of the building — continued under the supervision of a man whose name I do not recall — were not yet brought up to the roof level, I was engaged to resume charge of the work, and carried it to completion in 1864, entirely according to my own designs and original plan, as any Philadelphian professing to be conversant with the matter should know.

Very truly yours, N. LE BRUN, *Architect.*

THE DRAINAGE OF COUNTRY HOUSES.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — The communications printed in recent issues of your journal, from Mr. George E. Waring, jun., and Mr. Henry R. Towne, discussing the drainage of houses on level ground, have raised a question of great interest, and I ask permission to say a few words on the same subject.

There are situations and conditions which render practicable the system of house-drainage preferred by Col. Waring, which disposes of the liquid waste of the house by means of flush-tanks, settling cisterns, and irrigation-pipes. I have employed this system, somewhat modified, in draining my own country house, which stands on high ground, and has a sloping lawn of more than a hundred feet width, in the best position for the accommodation of irrigation pipes. I do not believe, however, that the system is one which admits of general adoption, nor one which will meet the requirements of most householders living within the narrow limits of town or village lots. Even where practicable, it does not seem to me to possess the theoretical excellence which is claimed for it. In summer, when evaporation is rapid and vegetation active, it is possible that the organic matter in the waste of a house would be taken up and assimilated by plants as rapidly as it could decompose in the soil; but I am not quite sure that even this is true in all soils. I have watched very carefully the workings of the system in my own grounds; and while the lines of drain-pipe are laid within eighteen inches of the surface, which is quite even, I have failed to discover any indications of a more rapid or luxuriant growth of grass or weeds near the pipes than remote from them. If, however, it be conceded that the system works well in summer under average conditions, I fail to see that my buried pipes are much if any better than a leaching cesspool during the winter months, when the ground is frozen and vegetation dormant. During this time the ground surrounding, and particularly that underlying the pipes, becomes charged with impurities which it cannot dispose of in a legitimate way. Long before they can be appropriated by growing plants, thawing snows and heavy soaking rains carry these impurities deep into the soil where the plants cannot reach them. In a light porous soil, there is nothing to hinder these accumulations of six or seven months of each year from working down until the soil is saturated and our own or our neighbors' wells polluted. We have, in the Northern States, only about five months of warm "growing-weather;" and in my judgment, draining into the soil during the other seven months means pollution of the soil.

From a careful study of the problem of house-drainage in unsewered neighborhoods, I am satisfied that the tight cesspool system is the only one which is practicable. I have many times

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during the past few years had occasion to recommend a plan of drainage which has the advantage of adaptation to all the conditions I have yet encountered in practice. It is neither an invention nor a discovery; but in these matters, the attainment of good results is of much more consequence than novelty or ingenuity in the means employed. I contract with a responsible mason to build a cesspool as "tight as a bottle." The price depends somewhat upon circumstances; but as I select my mason, and give him to understand that he is to estimate honestly on the cost of first-class materials and workmanship, and not as a competitor for a contract to be given to the lowest bidder, the price is usually reasonable and the work always good. When there is plenty of room, I put the cesspool from fifty to sixty feet from the house; when the lot is small, I put it as far away as I can. In shape, the cesspool is much like an old-fashioned coffee-cup; its size, taking an average, is five feet diameter at top, and six feet deep. I cover this with a stout platform, removable at will, from the middle of which rises a wooden chimney ten or twelve inches square in cross section, and three to five feet high, capped with one of Mr. Baldwin Latham's charcoal ventilators, or with a device embodying the same principle. At one side of the platform I set a pump, — any one of several makes is adapted to the purpose, — and run the suction-pipe down to the bottom of the cesspool. This pump is a permanent fixture, and is always ready for use. The house connection is made in the usual way; but I have no traps at any point on the line of the main waste or soil pipe, or the house-drain proper. The soil-pipe is carried up of one size from the foundation wall to and through the roof. The branch waste-pipes are of course trapped; but I take the precaution to use traps which cannot lose their seals from any cause except evaporation. The danger to be apprehended from the absorption and transmission of cesspool gases by the water-seals of such traps is obviously very slight, at most. With the house-drainage system open at both ends, no accumulation of gases at any point where they can be held under pressure is possible.

When the cesspool is full, it can be emptied in any way most convenient. In a town or village where an odorless excavator can be ordered, it may be emptied by lifting out the ventilating chimney, and dropping the suction-pipe of the apparatus through the hole in the platform. If the householder must attend to the work himself, he can do it in one or two ways, according to circumstances. In summer, if he has a garden, he may employ it for surface-irrigation. He can make a trough by nailing two boards together at right angles, and, putting one end of this under the spout of his pump, let the other end rest where the water will do most good. By providing two or three such troughs, made of long boards, he can irrigate a garden of considerable extent, and as frequently as may be needed. The organic matter already partially decomposed will be at once taken up by the plants; and the water is quickly absorbed by the dry surface soil, to be given off again in evaporation. In the winter, or in places where irrigation is not needed for the fertilization of a well-kept garden, the contents of the cesspool must be pumped into tight vessels of some sort, and carted away. A short piece of rubber tubing attached to the spout of the pumps, and half a dozen kerosene-barrels with tight-fitting bungs, will give the householder an odorless excavator of his own.

Concerning the views expressed by my very intelligent friend Mr. Towne, I can only say that, in my judgment, the leaching cesspool system is the worst which can be employed under any circumstances. I lately visited a town in which this system is carried out *par excellence*. The town is built upon a limestone formation, which is full of cracks and fissures; and, to dispose of any thing in the shape of waste, it is only necessary to dig down twenty or thirty feet, until the limestone is reached. Even privy-vaults empty themselves. The town has a water-supply drawn from sources not reached by the pollution of the soil; but within three years it has had two epidemics of typhoid fever, and is never free from sickness of unmistakably zymotic origin. We must not forget that, in pouring sewage into the soil, we are poisoning it for the future, near and remote. Coming generations will suffer, even if we do not, the consequences of so reckless a disregard of the precautions which the experience of centuries has shown to be essential to the avoidance of conditions prejudicial to the public health.

Respectfully,

NEW YORK, Jan. 22, 1877. JAMES C. BAYLES.

RENDERING STONE WALLS WATER-PROOF.

PROVIDENCE, R.I.

EDITOR AMERICAN ARCHITECT.

The recipe for preventing the penetration of moisture into brick or stone walls, given in your issue for Jan. 20, has been several times published in the London *Builder*. It was also published in 1860 in the *Architects' and Mechanics' Journal* of New York, in a slip quoted from the *Builder*, as described before the Royal Institute of Architects. The same slip gives another method by the use of sulphurized oil, prepared by subjecting eight parts of linseed oil and one part of sulphur to a temperature of 278° in an iron vessel. This is said to keep out both air and moisture, and to prevent deposits of soot and dirt, when applied with a brush to the surface of either brick, stone, or wood work. It would be valuable to know if either has been tried in this country, and found to be a permanent and effectual preventive.

Yours respectfully, C. P. H.

VENTILATING AND HEATING SCHOOLHOUSES.

TRAVERSE CITY, MICH., Jan. 25, 1877.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — I am getting up plans for a new schoolhouse for our town, and am very desirous of obtaining information with regard to the best furnace now in use, and the expense of the same, and also what is the most approved and effectual mode of ventilating large schoolrooms or other assembly-rooms. Will you please inform me through the *Architect*, what is the best furnace in use, and the best system of ventilating?

Yours respectfully, JOHN W. HILTON.

TRUSSES.

ILLINOIS INDUSTRIAL UNIVERSITY.

Dear Sir, — Allow me to suggest, that the "strains do not accumulate in the end braces of the parabolic, crescent parabolic, or the Pauli truss, the strains being in fact greatest in these braces nearer the centre. The strains in the chords are nearly uniform also, being a little greater at ends of truss on upper chord. For a "deck" bridge like that at Ashtabula the reversed parabolic truss could have been used without difficulty. The parabolic truss is used in the long bridge over the Elbe on the Berlin-Stendal Railway, I believe, but I do not recollect seeing it employed in this country.

Yours truly, N. CLIFFORD RICKER.

A JOURNEY OF AN ARCHITECT IN THE NORTH-WEST OF EUROPE. — III.

HOW CORNERS ARE TREATED AT HANOVER.

ONE of the most important questions to be solved in a new city, when once the general outline is adopted and the plan laid down,[1] is the study of the angles formed by the meeting of two streets. In certain towns, as at Turin, for example, which is the perfect image of a draught-board, no particular arrangement is necessary. In Paris, we see the houses at important angles, such as those which are at two cross-roads, distinguished from the rest by a special combination. Unfortunately, all the houses constructed under these conditions resemble each other so strongly, that it is not always easy to recognize them a second time.

At Hanover, the houses at the corners of a cross-road, or those fronting a square, are treated differently, according to the form of the site on which they are built, and the effect of perspective which they are intended to produce. When the disposition of the public road leaves a large vacant space before the building, the façade of such a house is treated otherwise than if it were built in a narrow road; and as, in spite of the width of the streets, the buildings which form them are relatively low, the system of ventilation is excellent. On a public promenade, or before a square, the look-out is skilfully arranged, so as to allow the inhabitants within the house to enjoy the prospect without. The windows have then a special form: they are wider and descend lower, and bay-windows are thrown out to enable persons to see what passes on every side.

A few sketches will illustrate what we have already said, and what is to follow.

Fig. 89 represents the front of a house, by Mons. Oppler, architect, built at the corner of two streets forming an acute angle with each other; the angular point is occupied by a bay-window of picturesque appearance; the two retreating fronts are much varied in their outlines, with very decided projections; their principal lines being also broken up by buttresses and gables, as well as by many recessed and prominent portions, the whole, from a front view, would have a heavy appearance, but seen sideways it is foreshortened, and a lighter effect is produced by the contrast of light and shade which soften down the details.

At an obtuse angle, on the contrary, the façades are thrown forward, and may be taken in at a single glance. There would be, in such a case, some fear of the monotony resulting from a long line of similar openings; in order to obviate this inconvenience, the façade is unequally divided, and the principal part projects beyond the wings. The lower lines extend regularly along the building, passing over the projecting portions, and thus producing a good effect; while in the wings there are the divisions with their projections. The stories vary in height, according to their importance and the part which they are intended to play; and in the thickness of the walls there are recessed balconies, surmounted by large arches, which extend over the windows on two floors. The whole is very subdued, and does not aim at effect so much as the

[1] In order to discuss the plan of Hanover, it would be necessary to have a knowledge of the local topography, which we do not possess; and we must therefore consider this plan a good one until the contrary is proved.

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preceding example, where the attention is arrested by each separate point; while here, on the contrary, the mass of the work was of sufficient importance to make it necessary to divide it, so as to allow the spectator easily to take in the whole effect from one ex-

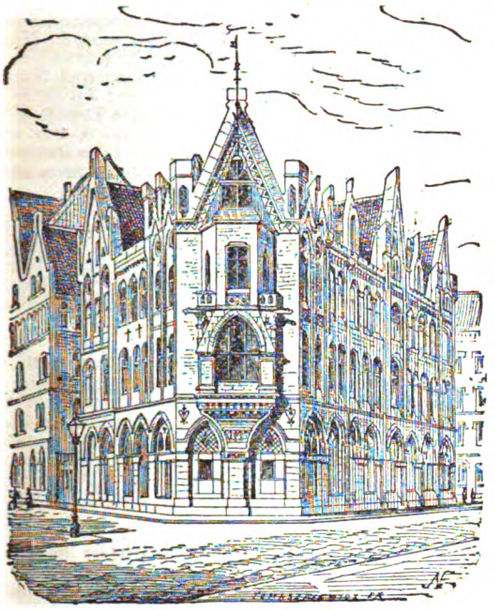

Fig. 89.

tremity to the other, and, by means of breaks and intervals skilfully interposed, to diminish the extent on which the eye would have to rest.

A building erected in a square (fig. 91) by Mons. Oppler, the architect, resembles in many respects the preceding structure; but with this difference, that the principal projection is more prominent, and assumes the proportions of an important decoration. The wings are relatively sacrificed to it, and throw into relief the middle of the building, which is treated in a more elaborate style, and differs from the rest both in form and the nature of materials. It is evident that a square surrounded by buildings with such outlines as these looks brighter and more cheerful than if the houses were uniform in appearance and height. It may indeed be replied that the latter plan — adopted, for example, in our Place Vendôme

Fig. 91.

and Place Royale, etc. — gives to them, according to academic conventionalities, a grander and more monumental aspect.

When a house is to be erected at a corner formed by the intersection of two or more cross-streets of secondary importance, the plan adopted is less rich, but the result obtained is always original, picturesque, and remarkably varied. We see that the architect has endeavored to produce a good effect with regard to perspective, and an outline which is striking at a distance.

Fig. 92 represents a small corner-house: it is distinguishable at

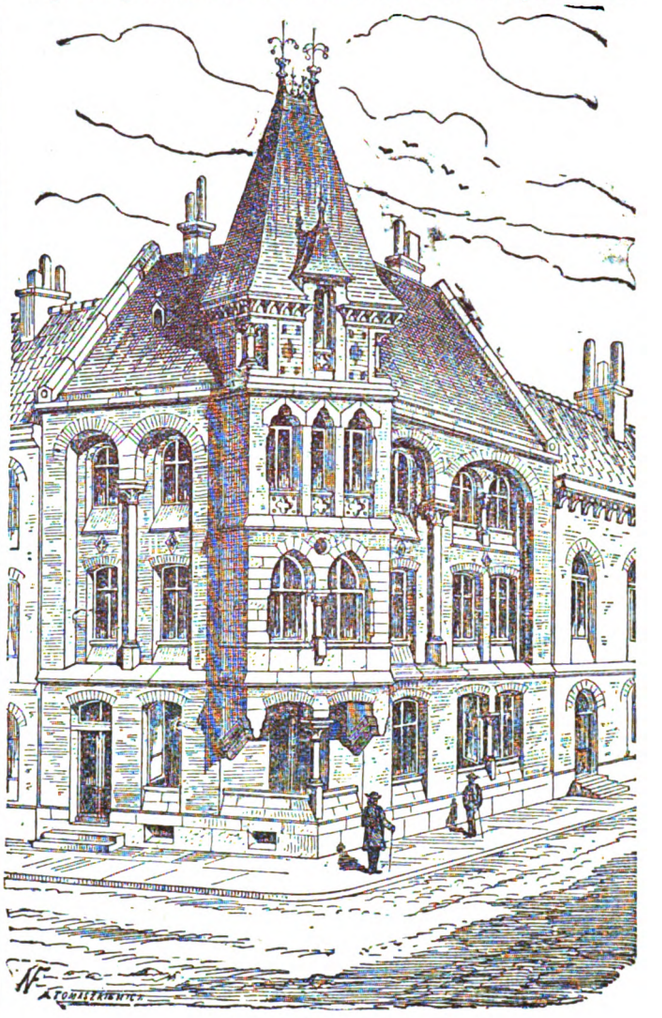

Fig. 92.

a distance, and cannot be confounded with the neighboring houses; the angle, being cut off, is superseded by a plane surface supported by a small column rising to the level of the ceiling of the first floor, and sustaining the balconies of the upper stories; and the whole arrangement carries out an ingenious idea, the conception of which is analogous with those to which we have already alluded, the principal aim being to attract attention to one special point, throwing into the background the other portions of the frontage, which are to some extent sacrificed.

These examples are only intended by us to explain the principal combinations adopted in the façades of Hanover. As to the use which the builder has made of the materials employed, and the arrangement of the ground-plan, these are questions which will occur hereafter, when we come to examine the interior of these dwelling-houses.

We will merely remark here that the houses to which we have just alluded are built, some entirely of bricks, and others of white stone and brick; that these bricks are of various colors, yellow, red, or black; that their form varies, as we have already shown; and that, according to the manner in which they are employed, they are well adapted to imbricated work of every kind, thus giving to the façades an appearance entirely new to us. We also feel assured that the inhabitants must find in the interior of their dwellings an enjoyment as great as the exterior produces on the passer-by. We can easily imagine what a charm must be added to an apartment by a bay-window filled with flowers, well exposed to the sun, with an extensive view, which diffuses animation and cheerfulness over the whole room.

We may also remark that these are not peculiarly luxurious houses or sumptuous mansions, but lodging-houses intended to be used by several lodgers; the ground-floor containing shops, and the upper stories the ordinary apartments.

ARCHITECTURAL DRAWINGS BY RAPHAEL. — Three unpublished architectural designs by Raphael were lately discovered in the architectural collection at the Uffizi, Florence.

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NOTES AND CLIPPINGS.

As we go to press, it is announced in the papers that the Strakosch Opera project, to which we have referred in our summary, has fallen through in consequence of the failure of negotiations with Mr. Vanderbilt for the land. It remains to be seen whether the elasticity of the projector will be sufficient to raise it into notice again.

OBITUARY. — At the regular meeting of the Chicago Chapter of the American Institute of Architects, held Thursday, Jan. 18, after the announcement of the death of Asher Carter, a former active member of the Chapter, the following resolutions and memoir were unanimously adopted and ordered published in the *Engineering News*, *American Architect*, and the Chicago daily papers, and a copy of them to be sent to the widow of the deceased.

Resolved, That the Chicago Chapter of the American Institute of Architects does hereby extend its sympathy and deep regret to the relatives and friends of the late Asher Carter, and that by his death there has been removed one who has ever upheld the dignity and honor of the architectural profession, and who through his quiet and studious devotion to his professional duties has earned the honor and respect of his colleagues.

Resolved, That the Chicago Chapter, fully knowing the merits and noble qualities of the deceased, particularly extends its sympathies to the bereaved widow.

THE DOME OF THE COUNTY COURT-HOUSE, NEW YORK. — It is said that the original plan will not be carried out in the octagonal dome now in course of erection. Massive piers of brick have been built from the foundation, up through the first floor, and stand on each side of the four entrances to the rotunda, narrowing these wide approaches from a clear space of about twenty-four feet to ten feet, or about the width of the stairways. Above this floor, they are to be built of brick and Nova Scotia stone. All the floors above the first one are of iron, and through these the workmen will cut and build up to the roof; whence, on pillars supporting arches, the stonework will spring.

BURNING OF A THEATRE. — At about ten o'clock Saturday night, Jan. 27, a fire broke out in the Academy of Music at Indianapolis, Ind., destroying the entire building together with five stores. Fortunately no performance was in progress. The loss will probably amount to $150,000 or $200,000.

THE STATE HOUSE GROUNDS AT HARTFORD. — The Trinity College buildings on the grounds of the new State House at Hartford will be abandoned soon after the commencement exercises next summer, and will then be demolished, and the site cleared up and turfed to correspond with the other portions of the grounds.

A NEW BROOKLYN THEATRE. — It is reported that negotiations are now pending for the rebuilding of the Brooklyn Theatre. The entrance to the theatre is to be on Johnson Street (instead of Washington Street), about twenty-five feet in width. The theatre will seat about twelve hundred. The stage will be against the wall of the police-station, and will be one hundred feet wide. The owners of the theatre property intend to expend about eighty thousand dollars in the construction of the new edifice, and build it in a thoroughly substantial manner, with every appliance for egress in case of fire; and a fire-proof drop-curtain is to be provided.

A SECOND BRIDGE BETWEEN NEW YORK AND BROOKLYN. — Ten engineers have submitted designs and estimates for a bridge to connect New York and Brooklyn near Blackwell's Island. It is said that ground will be broken as soon as a plan shall be decided upon. The preliminary specifications call for an approach on the New York side of 4,580 feet, 1,000 feet of which is to be in form of a tunnel extending from Fourth to Lexington Avenues. From the end of the tunnel, an iron superstructure, curving to the centre of the blocks between Seventy-sixth and Seventy-seventh Streets, and thence direct, leads to the river. From the pier on the brink of the river, Blackwell's Island will be reached by a single span of 734 feet. An iron structure 700 feet long will then lead over Blackwell's Island; and the channel between the island and the Long Island shore will be spanned by a single arch of 618 feet. The shore approach on the Long Island side will be 3,900 feet in length. This will give in all a total length of 10,532 feet, or nearly two miles. A single track tramway will run across the bridge. There will be, in addition to the main approaches, two auxiliary ones; one from Avenue A on the New York side, and the other from Vernon Avenue, Long Island City. The spans are to be 135 feet above mean tide water. Double passenger elevators are to be placed at the piers on each side. A single arch of 618 feet span sounds rather magnificent, and almost impossible of accomplishment, when we consider that among the largest arches hitherto constructed, the Cabin John Bridge — circular — of the Washington Aqueduct measures only 220 feet, and London Bridge — elliptical — measures only 152 feet clear span. The suspension bridges at Niagara and at Freyburg, Switzerland, have each a clear span of 800 feet, or only a quarter more than the span of the proposed arch.

MUSEUM OF INDUSTRIAL ART. — New Haven, Conn., is to have a museum of industrial art. The articles already in possession of those who are interested in the enterprise are to be placed in the old State House.

THE CATHEDRAL OF RHEIMS. — The Cathedral of Rheims is to be restored at a cost of more than $400,000. It was begun in 1212 from designs by Robert de Courcy, and was finished about 1430. Its predecessor dated from the ninth century.

THE PERMANENT EXHIBITION. — The Permanent Exhibition at Philadelphia will open in April. In the centre of the building in the north gallery, will be placed the great Centennial organ, with an area sufficient for musical performances. The arrangement of the exhibits will be such as will bring similar articles of the same group in close proximity to each other, thus facilitating comparison and study. In the west wing on the north side, commencing at the west end, will be the following courts, in the order named: Norwegian, Swedish, Danish, Tunisian, Turkish, Spanish (agricultural), and Chinese. On the south side as follows: Egyptian and Spanish (industrial). In the east wing, on the north side: Japanese, French Crystal Court, Belgian, Swiss, Mexican, and the Brazilian Pavilion presented by his Majesty Dom Pedro II. The north-west section of the building will be devoted to agriculture, and in the south-west will be the machinery department. Arrangements have been made for a collective display of ceramics from different countries.

CLEOPATRA'S NEEDLE. — The *Pall Mall Gazette* says there is now a prospect that Cleopatra's Needle, which was given by Mehemet Ali to the British Government, and which has remained so long on the shore at Alexandria, will, before many months are over, be set up in London. The engineer who will have charge of the matter estimates the cost of moving it at $35,000.

THE ROYAL ALBERT HALL. — The Royal Albert Hall, London, which holds 7,000 people, can be emptied in less than seven minutes, as there is one door of exit for each 200 persons. On the roof there are twenty tanks, each containing 2,000 gallons of water, supplied from an artesian well at the back of the building; these if emptied can be refilled in twenty minutes. There is also a special high-pressure service surrounding the building, with six fire-plugs. All the fire appliances are inspected weekly by an inspector who is not one of the ordinary staff of employees of the building.

MODERN ANTIQUES. — Down among the potters in Lambeth a little story is told, which illustrates the manner in which modern antiques come to be heard of. A pottery lad found something that bore a faint resemblance to what might have been a drinking-vessel. He thought it was, and certainly it looked very old. Inquiry at the British Museum procured him no information regarding its age and value, but in lieu of it an offer of $1.87½, which he declined to accept, opining that his prize must be worth more than the nation would offer for it. He took his "find" to the overseer in his place of employ; and that clear-headed person quickly demonstrated that the piece was a common three-cent squat mug of yellow earthenware, broken and thrown aside, its sharp jagged edges softened down by the action of running water, and its color completely changed and destroyed by atmosphere and dirt; in fine, it was a bit of rubbish whose only use was, with other material of the kind, to make up a new roadway. The boy had been too anxious to trade, or the broken clay might perchance ere this have been described in the national catalogues and hand-books as one of those precious relics which prove that the conveniences of life were not unknown in Britain long ago, —

"When wild in woods the noble savage ran."

The loss to the nation in that instance was atoned for, however, by the gain of a distinguished public man and the country on another occasion. An eminent sculptor going to the South Kensington Museum, was much struck by a valuable antique which he saw in the loan collection of maiolica and Della Robbia ware. He remembered that when engaged in early professional life at the Staffordshire potteries, he modelled a statuette. It was flawed in firing, and at once condemned as "a waster;" and as the dealers in faulty ware would not have it at any price, it was painted over the back to conceal the fault, and then got rid of. Subsequently that statuette passed into the hands of a dealer who estimated it highly. By him it was sent for exhibition at a *conversazione* of the Fine Art Club; and after some higgling about price, it exchanged owners for $625, $750 having been first asked for it. Had it been a perfect copy it would have been sold in Staffordshire for $7.50; but the flaw deprived it of half its value. The sculptor easily identified his own work on seeing it at the Museum, not only by the design, but by the crack in and the paint on the back, and the painter who concealed the flaw from vulgar eyes is still living. Its latest possessor, despite the overwhelming evidence submitted to the contrary, was pleased still, however, to regard this work of art (in a double sense) as a genuine antique, far transcending the powers of any living sculptor, and wonderfully cheap at the price he paid for it. An ex-premier of England, who failed to dispose of his collection awhile since, could say who that refreshingly innocent and happy owner was.

THE HOME OF AN EARL. — The London *World* says the new mansion which the Earl of Ellesmere is building on his Northamptonshire estates is nearly completed, and, with the extensive stabling attached, will have cost by the time it is in occupation some $750,000. Being close to Brackley, Lord Ellesmere's seat is in the centre of a fine hunting district, and its erection has given a remarkable impetus to the picturesquely situated and old-fashioned town.

A PARIS CHURCH DAMAGED BY LIGHTNING. — The little Gothic church of Kernaschen in the commune of Saint-Carade-Tregomel, built by Alain de Rohan in the fifteenth century, was lately nearly totally destroyed by lightning. The steeple was struck and fell through the roof, crushing in its fall fretwork and pinnacles, and doing much damage to the sculpture in the interior.

MONUMENT TO LINNÆUS. — For the erection of a monument to Linnæus thirty-six thousand crowns have been subscribed. The monument will be erected in Stockholm, and will be unveiled on January 10, 1878, the hundredth anniversary of the death of the great naturalist.

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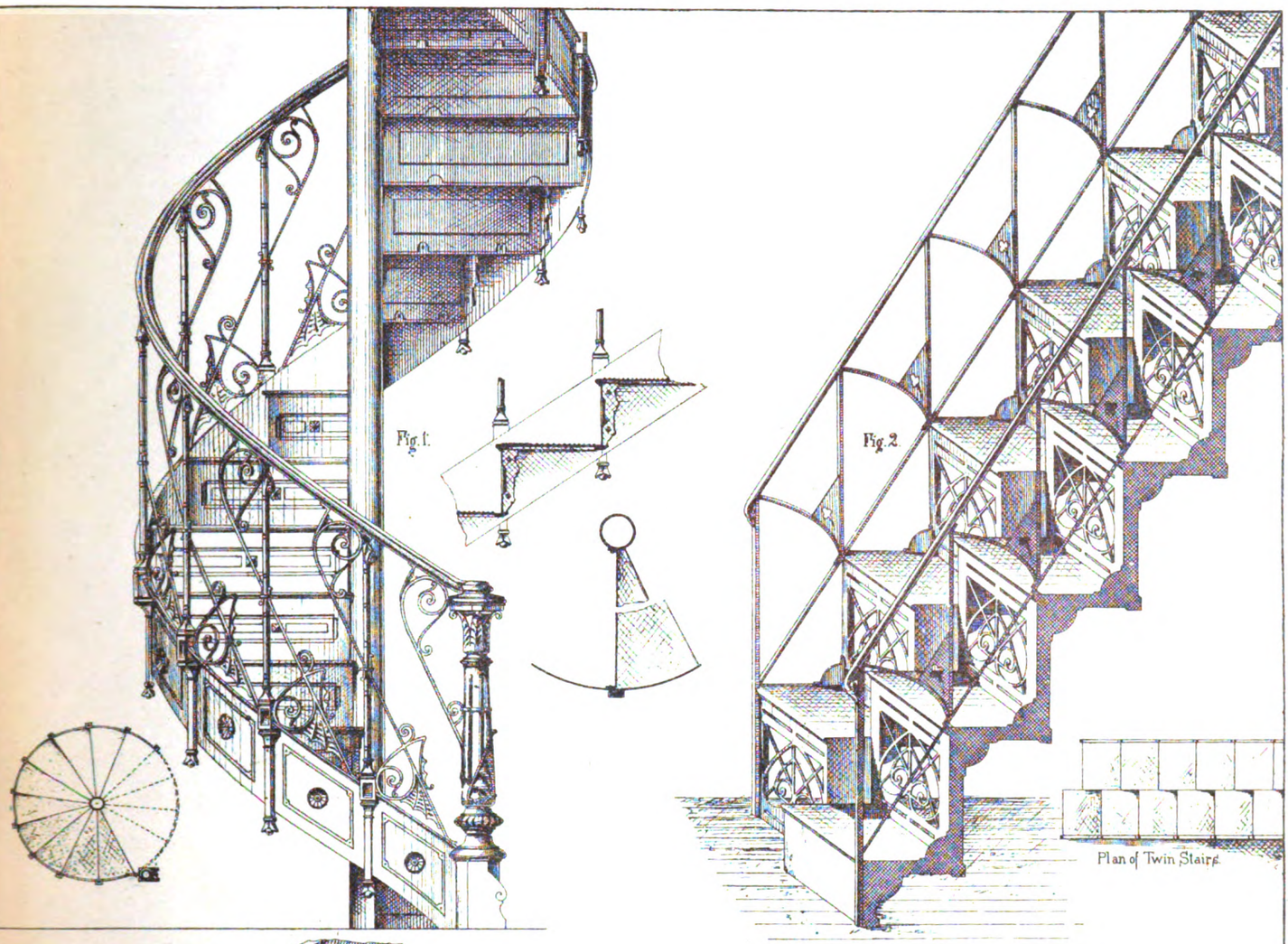

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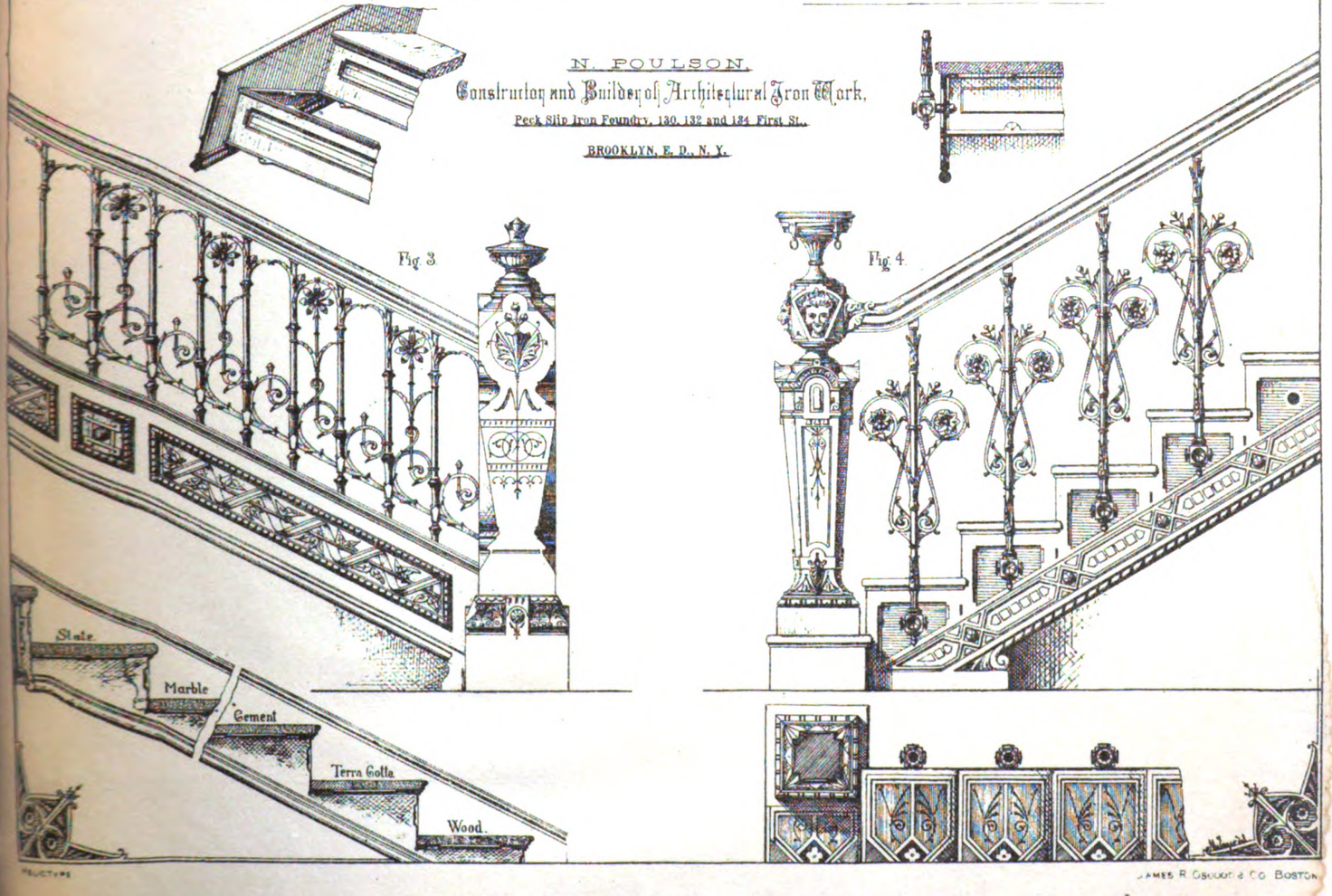

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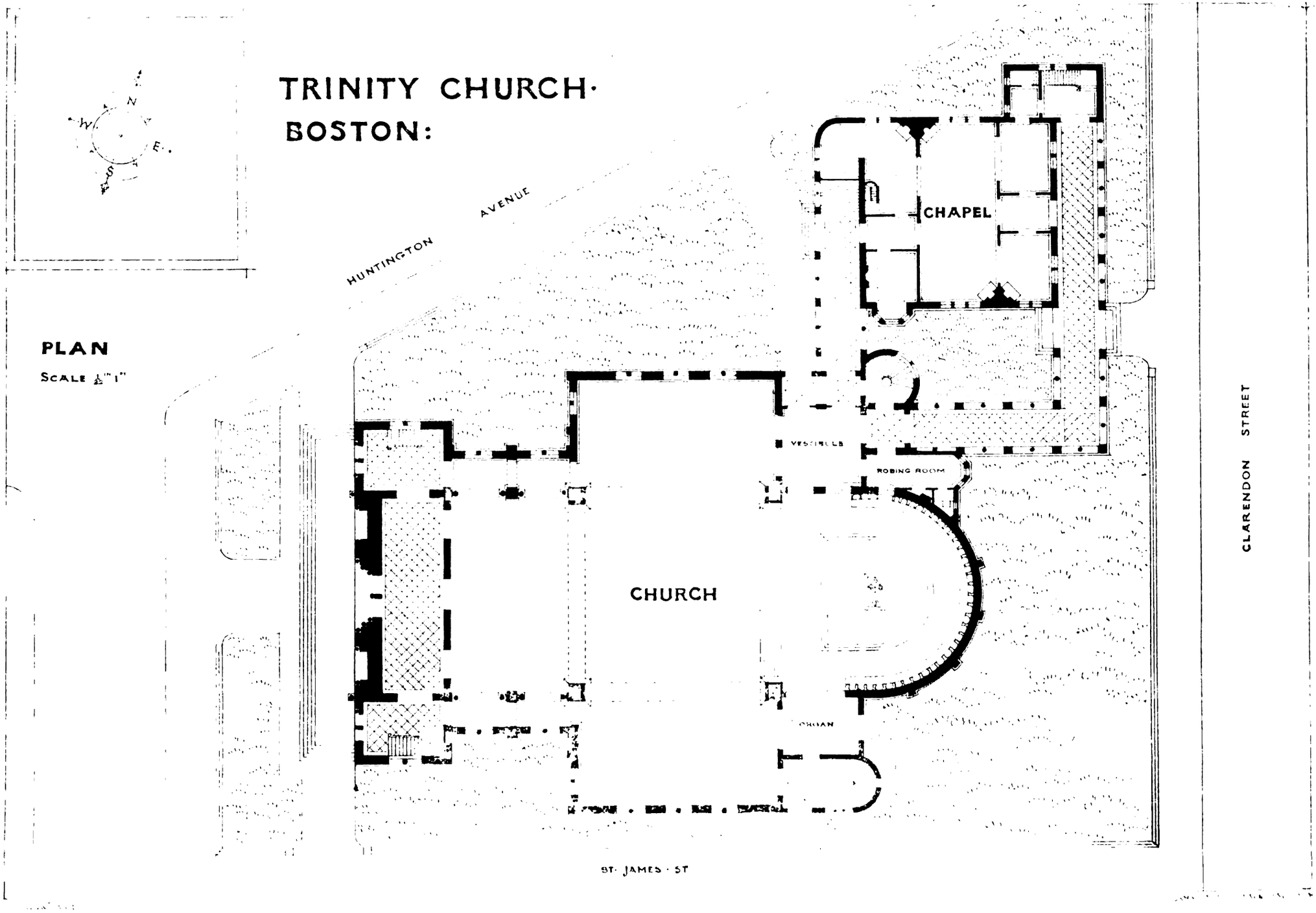

PLAN

SCALE 1/8" 1'

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, FEBRUARY 10, 1877.

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WE have hitherto said nothing about the quarrel over the Third District Court House in New York, because the matter was undergoing official investigation. The investigation is now finished, and the committee of the Board of Aldermen have reported. The main facts in the case are these: Mr. Robert Cushing, one of the contractors on the work, brought in a bill of seventeen thousand dollars for extras, which the architects, Messrs. Withers and Vaux, refused to allow, and the commissioners therefore refused to pay. He then sued the city, and lost his suit. Thereupon he brought a long list of charges against the architects, accusing them of incompetency and misconduct in a variety of ways. The only charge, however, which on examination proved to have any weight, was that every bidder had been obliged, before he could get even a look at the drawings, to pay the architects ten dollars for a copy of a bill of quantities, on which his estimate must be based, and to sign an agreement to pay them three-quarters of one per cent for making out the bill in case his bid was accepted. Certain other contractors, the brothers Horgan and John Hogan, joined in this last accusation. It appeared, however, in the course of the examination, that the bills of quantities were not prepared by the architects, but by two other gentlemen, Mr. Oswald and Mr. Radford, to whom some of the supervision of the work was deputed, and who prepared the bills in their own unemployed time. It appeared further that the architects had no interest in the matter, the payments being made to Messrs. Oswald and Radford, and that so far from the contractors being required to pay for the bills, it was optional with them to use them or not. The Horgan Brothers, in fact, got their contract without making any use of the quantities or any payment. Finally the evidence showed that the quantities were taken and the bills supplied without any understanding with the architects, in whose office the plans were not kept, and who were not informed of the matter till it had taken place. It appeared also that the Horgans and Hogan, who supported Cushing's accusations, were men whose work had been rejected as unsatisfactory by the architects, and who had been compelled to do it over again, and who thereupon, like Cushing, had brought in charges for extra work which were disallowed.

WHAT Mr. Cushing chose to call blackmailing was therefore, it appears, simply an effort, not objected to by the architects, to introduce the custom, time-honored in England, of furnishing the bidders with the quantities on which their estimates are based. This is often done by the English architects themselves, but in London at least it is done by a distinct class of men called quantity-surveyors. The work is laborious and responsible, and requires much special knowledge. The fee of three-quarters of one per cent charged for it is not thought too large. In France the corresponding functionaries, called *métreurs*, are legally entitled to a fee of from one and a fifth to one and a half per cent, according to the kind of work which they measure. The system has its advantages and its disadvantages, but the first would seem to outweigh. The quantities must be taken out; and it is more economical on the whole to have it done once for all by a surveyor than once for each by all the bidders; besides which the surveyor's work is apt to be more accurate than the rough and hasty computation of the bidders, and puts them more on an equality. The certified bill is of value in determining claims for extra material, and moreover takes away a temptation to the bidder to allow for scant material. Nevertheless, we are told, and perhaps for this very last reason, there is a growing tendency among the English mechanics to neglect the surveyor's quantities and take out their own. It is a system which we should expect to suit American ways, and to become popular here when it was once understood. The time of most Americans is valuable to them, and they do not like to waste it. The cost of a bill of quantities divided among all the mechanics who compete for a given contract is but a trifle compared with what their united time would amount to where each one did his own measuring. One of the contractors in the case in New York testified that to take out his quantities for himself would have cost him two or three hundred dollars; that they would not have been so accurate as those that were furnished, nor his estimate consequently so close as it was; and that he would rather have agreed to pay the five or six hundred dollars that he did pay, in case of success, than be obliged in any case to pay half that sum to supply them himself. Two reports were submitted to the New York Board of Aldermen by their committee. The majority report condemned sweepingly the system of furnishing the quantities as "a most improper and pernicious practice," and censured the architects for permitting it, while it declared that they found no proof whatever that the architects were in any way interested in the commissions received for it. The minority report approved the whole proceeding.

THE Congressional Library has been a football for some years. The need of new accommodation for it has been sorely felt for a long time; and three or four years ago a competition was opened among architects for a new building. This resulted in giving a first prize to a design by Mr. Melander, and a second prize to one by Messrs. Peltz and Smithmeyer, if we remember rightly. At this point the matter dropped, and lay dormant till recently the need, which grows always more pressing, has again been brought to notice, and the provision of a new building discussed. Now it is reported in the papers that the Joint Committee of Congress on the Library has in preparation a bill providing for the extension of the east front of the old Capitol, so as to give quarters for the library in it. So far as we can judge with no plan of the proposed alteration, this seems to be an unpromising scheme. The east front of the Capitol has always been intended to be its principal front. The central portion of it is the grand vestibule, serving as its main entrance, and the chief approach to the rotunda. To block this space by putting a new library in the front would be to ruin the plan of the building, we should say. Mr. Walter in designing the new wings also designed, we have always understood, a new centre which should support them more adequately than does the old central mass, which is, except for the dome, substantially in the condition in which Bulfinch left it, the material being of sandstone painted, while the wings are of marble. The newspaper report says that an appropriation of two hundred thousand dollars is proposed to begin the work, which will cost a million dollars. This looks as if definite plans must have been prepared, and some estimate made of actual work to be done. To undertake a further extension of the Capitol from any designs but Mr. Walter's would be at once an indignity and a misfortune.

THE verdict of the coroner's jury on the Brooklyn disaster does not mince matters about the culpability of the managers' neglect to guard against fire in their administration of the theatre. It reasonably censures the neglect of the fire apparatus and its inefficiency, the want of discipline and responsibility among the employees, the fastening of one exit from the dress-circle, the cumbering of the stage with scenery not in use, and says that the failure to take warning by

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the two fires which had occurred just before the final and fatal one was "a violation of a most vital duty to the public." The jury recommend that in future theatres there be a brick proscenium-wall, that there shall be two wide and commodious staircases to the upper gallery, with one or two others of the recognized precautions; and in general terms warn the public to demand stricter laws for the construction of buildings for public amusements. This is well, and may, we hope, have some effect for the moment at least, on managers and on what the public demands of them. But with regard to the original vices of the theatre itself, by virtue of which the fire once allowed to occur was made terribly disastrous, the report is singularly reticent: we see no other word for it. The theatre is described as substantially built, and "admirably adapted for the purpose for which it was intended."

THE last statement may be true, but consideration of the planning has convinced us that the security of the audience was no real part of that purpose. As for its being substantial, what may be so called in one building is not so in another. A warehouse built like a substantial shed is not substantial; nor is a theatre, built like a substantial dwelling-house; or if the word is used in a sense that allows this application, its use is altogether irrelevant to the subject of the verdict. A theatre which burns through the roof and consumes its audience in ten or fifteen minutes from the moment when a fire takes in the scenery cannot be said to be substantially built in any sense that is worth any thing. The report says cautiously that there would have been "greater security for the safety of the audience" if it had had a brick proscenium-wall, and two hand-rails to the gallery stairs. They leave it to the reader to remember or discover that there was but one stairway to the upper gallery, and that this stairway was deplorably inadequate. They do not say that the box-office where one of the previous fires occurred was under this very stairway, nor that the space over the ceiling of the auditorium was stored with combustible rubbish; nor finally that in planning the theatre it was turned the wrong way, and the audience made to go in at the rear for the sake of getting an entrance on Washington Street. All these errors, we are glad to hear, are to be rectified in the rebuilding; but they existed none the less in the former theatres, and the verdict as it stands seems to us a curiously one-sided document.

THE report for 1876 of Mr. Shaw, the Inspector of Buildings of the city of Boston, shows the effect of business depression upon building during that year. Only 200 permits were issued for buildings of brick, iron, or stone, within the building limit. This is in singular contrast with the number, 1,586, named for Chicago during the same time. The balance is, to be sure, somewhat redressed when we compare the cost (above three and a quarter millions of dollars) of the two hundred buildings in Boston with that (eight millions and a quarter) of the sixteen hundred in Chicago, — unless, what seems possible, there is an error in the second amount, which we took from one of the Chicago papers. Besides those that we have mentioned, 532 permits were issued in Boston for wooden buildings outside the building limit, at an estimated cost of one million and a third. Among the 200, 96 are dwellings, 20 are family hotels or tenement houses, 13 are the same with shops under them, 23 are mercantile buildings, and two are churches. The greatest number, 62, are three stories high; the next, 51, four stories; only 15 are five stories. It is in notable contrast to the former prevalence of mansard roofs in Boston, that while only 84 of these buildings have them, in the two chief business wards, the sixth and twelfth, every one has a flat roof. Of the 86 mansards, 36 are in the so-called Back-Bay ward, the fashionable residence quarter; and the distribution of the rest shows that nearly all of them must be upon dwellings. Among the whole 200 are only 10 with pitched roofs, and all but three of these are in the extreme suburban wards; so that it may be said that no pitched roofs are built in the city proper. So entirely has the old fashion gone out.

The number of fires in the year was almost three hundred, and the estimated loss by them nearly one hundred and eighty thousand dollars. This may be regarded as the income at nine per cent on two millions of dollars invested during this year by the people and the insurance-companies in the privilege of building combustible houses. The questions of building-construction and fire-proofing, and the safety of halls and theatres, naturally claim Mr. Shaw's attention. He pleads wisely for more stringent building-laws, and for the adoption of some of the provisions which are common in Europe, citing extracts from the laws of Vienna and London, and also from an address of Mr. Oakey, the President of the National Board of Underwriters, in which he says that our careless ways of building make our insurance rates four times higher than are charged in Great Britain, France, or Germany. An act supplementary to the existing building-law was passed by the State Legislature in the beginning of the year, which fortunately gave the inspectors authority to insist on the most necessary precautions in theatres and halls when the warning of the Brooklyn catastrophe came. What precautions were imposed has been sufficiently made known. The only unusual thing that we notice is his combination of a wire curtain, a woollen curtain, and a sprinkler to keep it wet, at the proscenium openings. While the requisitions made upon the theatres have been met readily by the proprietors, we understand, we mark the significant statement that immediately after the passage of the act of 1876, Mr. Shaw called the attention of the City Council to the insecure condition of certain of the city buildings in regard to egress and to fire, and that their condition is still unchanged. These buildings were public schoolhouses. *Quis custodiet ipsos custodes?*

WE are again obliged by want of space to hold over our editorial writing till another week, — a postponement which we presume our readers will easily forgive.

AUSTRIAN AND FRENCH BUILDING-LAWS.

BY NELSON L. DERBY.

THE following translation of the building-laws of France and Austria, as far as they relate to fires, especially in theatres, has been prepared by the direction of the Committee of the New York Chapter of the A. I. A.; which committee is now considering a revision of the New York building-act. The Vienna laws were codified and published in 1875; the French laws date from 1864.

LAWS IN FORCE IN VIENNA.

In every new building a fire-proof stairway must extend from cellar to attic. In buildings of great size, several such stairways must exist. The balusters must be at least three feet high and of fire-proof material. The width of the stairs must be at least 3½ feet; treads must not be under 11½ inches, nor risers more than 6¼ inches. All skylights above stairways must be framed of iron, and rest upon masonry. All passages communicating with stairways must be at least four feet wide, must be fire-proof, and must be provided (if open on one side) with rails of incombustible material, three feet high. The floor directly underneath the roof must be massive (formed of half trees touching one another), must be covered with a three-inch layer of dry incombustible matter (generally the refuse mortar and plaster of demolished buildings), and paved with brick. The roof-plates must rest upon masonry walls rising three inches at least above this brick flooring. Buildings of great size must be divided by brick walls, once in every hundred feet of length, and these walls must be carried six inches at least above the roof. Openings through them must be closed by self-closing iron doors, which can be easily opened from both sides. These doors must be hung in iron frames. In all buildings occupied by large numbers of people, fire-extinguishers must be kept on hand. Stairways serving for the exit of fifty people must, if straight, be four feet wide; if not straight, five feet wide; while for every additional fifty people, six inches must be added to these widths. All floors of wood must be deadened by a three-inch layer of dry incombustible matter."

[These laws are thus generally expressed, from the fact that in Vienna almost all buildings serve in great part for the same purpose, viz., apartment-houses. — *Translator.*]

FRENCH BUILDING-LAWS.

Translated from the "Code des Théâtres," published in Paris, 1876.

2. A theatre may be either isolated or adjacent to other structures, at the pleasure of the proprietor. In the first case a vacant space of at least three mètres must be left between it and the neighboring buildings; this space to be increased where they have the right of light. In case of its being adjacent to another building, the ordinary party-wall must be increased by ten inches

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(twenty-five centimètres) of brickwork. Where the theatre is of great size this thickness must be proportionately increased.

3. All interior walls, walls separating the actors' dressing-rooms from the theatre, the proscenium wall, the wall separating the auditorium from the vestibule and from the stairways, must be of masonry. The doors of the actors' dressing-rooms communicating with the theatre must be of iron and self-closing. The proscenium wall must rise above the roof. Where it is pierced by openings other than the great stage opening, iron doors must be provided. The stage opening must be provided with a curtain of wire network, whose meshes shall not have a greater width than two inches (five centimètres.) This curtain shall completely cover the opening, and be suspended by incombustible cords. The decorations placed above the proscenium opening must be of incombustible material.

5. All stairways, the floor of the auditorium, and the partitions of the corridors, shall be of incombustible material.

6. The ceiling of the auditorium must be built of iron and plaster, without the use of wood.

7. On some portion of the proscenium wall, at the greatest practicable height, shall be placed a fire-extinguishing apparatus, with attendants in charge: besides which, hydraulic pressure sufficient to force a stream of water upon the highest portions of the building shall be provided. The importance of this apparatus must be proportioned to the size of the theatre.

8. Pumps must be placed at the level of the ground, in an apartment separated from the theatre by walls of masonry.

9. These pumps must be supplied with water by the city mains, which shall feed reservoirs; also by a well. Each of these sources must alone fully supply the pumps.

10. Around the theatre, hydrants, whose number is to be determined by the proper authorities, shall be placed; these to be fed by the city mains.

11. The auditorium may be heated only by means of openings furnishing warm air rising from furnaces in the cellar. These openings must be placed twelve inches (thirty centimètres) above the floor.

12. Thermometers must be exposed in the corridors, and ventilation suitably provided for.

13. No workshop can be placed above the stage. Above the auditorium, workshops for painters and tailors only may be placed, and then only under the condition that their floors are deadened and paved with tiles. When painters' shops are located here, unless the roof is of iron, or is filled in between the rafters with plaster, their partitions must be plastered, and covered with tiles. Communication between these rooms must be secured by doors of iron.

15. No other division of these lofts can be made.

17. Every theatre must have exterior to itself a storehouse for scenery and stage-machinery. This shall be located under the direction of the proper authorities. All other store-rooms must be separated from the theatre proper by a wall of masonry.

19. No store or warehouse in a theatre building can be let for the accommodation of combustible matter.

20. No one but the janitor and ticket-seller may be lodged in any part of the theatre communicating with the auditorium.

21. No theatre may be opened until so authorized after inspection. If changes are found necessary at the first inspection, a second inspection must follow before the opening.

22. The authorities shall inspect every theatre daily.

28. A force of firemen shall be stationed in every theatre, and shall register their rounds by means of dials placed at points determined by their captain.

54. It is forbidden to smoke upon the stage or in the auditorium of theatres.

ARCHITECTURAL ILLUSTRATIONS.—I.

[Condensed from a paper read before the "Architectural Association," London, on Friday, Jan. 12, 1877, by Maurice B. Adams, A.R.I.B.A.]

In the illuminated MSS. of the middle ages, more especially those of the tenth and beginning of the eleventh century, ample illustrations of architecture are to be found. Suffice it to say, that without these valuable records the student would have but a faint idea of the real beauty and elaborate character of Anglo-Saxon architecture, the actual remains of this date being necessarily very scanty, the rough and massive parts alone remaining. The shortness of our time will also prevent our touching upon mediæval drawings. Their chief characteristic is their boldness and vigor, and for the most part they seem to be sketches with figured dimensions, rather than measured drawings. Turning from these to wood-engraving, we find the earliest woodcut print known bears the date of 1423, and the first engraved metal plate 1461. The first book published with plate engravings was Dante's "Inferno," which appeared in 1481. Perhaps the earliest instance of architectural illustration published in book form is the edition of Vitruvius by Frontini, date 1496. The material and the construction of the buildings are shown in the sectional parts, which was not the case in most of the later editions and subsequent works of the kind. In Germany, early in the sixteenth century, we have the splendid woodcuts and plates by Albert Dürer, whose illustrations of architecture in the backgrounds of his pictures deserve the closest study. His drawing was thoroughly Gothic in spirit, and equally adapted for the style of work he represented. The starting-point of our subject in England dates from the middle of the seventeenth century, when we arrive at a considerable advance in the art of engraving compared to that found in the books already mentioned; but we lose that technical quality which renders the illustrations of architecture of value to the student. If the drawing of the architect has to be rendered by other than a specially trained hand, it is obvious that much accuracy and feeling will be lost. Hence the surpassing advantage of those modern processes by which an original drawing can be mechanically reproduced without the intervention of any hand-work whatever. But to return. The earliest works of any importance for their engraved illustrations of buildings are Dugdale's "Monasticon," and Dugdale's "History of St. Paul's." The "Monasticon" bears the date of 1655. The plates were chiefly by Hollar.

A book illustrating St. Peter's was published at Rome in 1684, which shows that building in a more technical manner, and as a contemporaneous publication deserves mentioning. The designs of Inigo Jones were not published till 1727, when they were illustrated by Kent. The first edition of the "Vitruvius Britannicus" appeared in 1717. In 1728 James Gibbs published his "Book of Architecture," which furnishes an admirable series of details in his well-known style. Most drawings of this date have a gray and monotonous effect, — the windows being treated as mere holes in the wall, so to speak. The plates are executed on copper, in what is called "stroke" engraving, the instrument used being a "graver," which gives a clear and decided line, quite different in effect to the freedom of an etching-needle. It is this period that the school of English engraving dates from; previously the work had been executed by foreigners. Hogarth was one of the earliest English engravers, and his works are familiar to you. We now arrive at the first glimmerings which foreboded the advent of the Gothic revival. All traces of mediæval principles had ceased to exist in the practice of architecture; and "if there is one period more distinguished than another for its neglect of Gothic, it was certainly the middle of the eighteenth century." For illustrations published at this time, few are of more interest than those of the much-abused Batty Langley. To his drawings we owe most of the so-called Gothic work of that time. Leaving the works connected with the Gothic revival for the moment, we note in the words of Mr. Fergusson the "publication of Dawkins and Wood's illustration of Palmyra and Baalbec, in 1750, which first gave the English a taste for Roman magnificence undiluted by Italian design; but the works which permanently affected the taste of the country were the splendid series of Stuart's 'Athens' in 1762." The care of these plates is deserving of all praise, especially the drawing of the sculpture, though the stippling is overdone, and the views generally are too dark. These remarks refer to the first edition. Nothing could surpass the plates published in the last edition, with the supplemental volume by Professors Cockerell and Donaldson (1830). Reverting again to the Gothic school, it is interesting to remark the entire absence of sympathy for the style. Indeed, so entirely lost was the spirit of mediæval art that the drawings of those who professed their preference for Gothic work are made in the same feeble way, regardless of all feeling. James Bentham's "History of Ely Cathedral," and Grose's "Antiquities of England and Wales," are of this class. The next name in my note-book is John Carter. He was the author of several important books, the most valuable being his "Ancient Sculpture and Painting of England," 1786, republished in 1838. To John Carter's rendering of mediæval art the revival is greatly indebted; while his writings, extending over twenty years, had great influence in forming a taste for Gothic amongst thousands who had hitherto regarded the style as worthy of no consideration but contempt. In 1786 the first professional journal in this country was started, under the title of the *Builder's Magazine*. It was edited by George Cook, architect and builder, and illustrated by John Carter, to whom its chief merits are due, although his designs, which furnished materials for most of the plates, are all in very bad taste, judging by present standards. The admirers of Gothic, however, were not sufficiently numerous or enthusiastic to support a journal of their own; so that the *Builder's Magazine* only lived through one volume.

Among the books of architecture published during the Georgian period few have more interest to us, especially at the present moment, than the work of the Brothers Adam, whose "Architectural Designs" came out during the years 1773 to 1822. The plates were engraved by Bartolozzi, Piranesi, and others. The book opens with a beautiful drawing, representing Minerva in the act of pointing a student to Greece and Rome as the source of all true art and literature; but, however worthy the conception and wholesome the advice embodied in it, we do not find the authors always practising their precept, charming as some of their designs undoubtedly are. For instance, they favor us with a new order, calling it the "Britanic." The design is characteristic of its name, as the lion and unicorn are used as volutes on a composite cap, and are interspersed in the foliage of the frieze after the manner of a chevy-chase. This was proposed for Carlton House. In 1805 Frederick Nash, the first of the line, gave to the world his aquatint views of St. George's Chapel, Windsor, with details to inch scale. In considering the subject of architectural illustrations, few names deserve a higher place than John Britton, the author of

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some seventy works, a large number of which were illustrated. Among the most important were the "Antiquities of Great Britain" (1814), and the "Cathedral Antiquities." The picturesque, however, predominates over the technic in both these works, the geometrical drawings being to an exceedingly small scale. It remained for the elder Pugin to supply this want of knowledge, and insure those qualities to the Illustrations of Architecture which render them of value. Pugin and Le Keux published their "Antiquities of Normandy" in 1827. There is one peculiarity worthy of remark in the elder Pugin's drawings. It is their exceedingly fine line, enriched with back-lining, which at once destroys all breadth of feeling, and gives a perplexing effect. This practice of back-line was not confined, however, to Pugin. The younger Pugin first brought about a change in the system; but, to quote an authority, "there is a fizziness and action in all his plates, which may be looked for in vain in the real thing." If the influence of the works of Pugin is more vivid to us, the important researches of Cresy and Taylor must not be overlooked. In 1829 they published their work on the "Middle Ages in Italy," illustrated by steel plates, the tinted sheets being colored by hand. Their celebrated work on Rome appeared in 1821, with 135 plates, from actual measurements taken on the spot. The views are well etched by George Taylor; but the details are poor specimens of chalk lithography, excepting those of the larger caps. The geometrical drawings are in outline; and it is worthy of remark that the various materials and the manner of construction employed are carefully shown.

Turning once more to the Gothic school, the name of Lewis Nockalls Cottingham is conspicuous; to him we owe the first full-size details of architecture ever published. They appeared in his book illustrating Henry VII.'s Chapel, Westminster, dated 1822. The plates are in outline, and very well drawn. In classic architure the first full-sized drawings published were probably those of the Erechtheion at Athens, by Henry Inwood, architect of St. Pancras Church. They appeared in 1830.

I have not yet mentioned mezzotint engraving, which was very generally employed during the early part of the present century for popular illustrations of architecture. It was invented in 1643. The impression which a mezzotint plate yields resembles a drawing executed in washes of color. The process is exactly the reverse of that adopted in other styles of engraving. The whole of the plate is covered with a uniformly dark barb or ground, the design having been previously traced on the surface of the plate in the usual manner. The highest lights are then scraped away and burnished, the second lights being treated next, and so on till the work is finished, leaving the untouched ground for the darkest parts. Aquatint is similar in character to mezzotint, and is a more recent invention. In either an Indian ink or bistre drawing can be very closely copied; but like all colored drawings the tendency is to obliterate the details of a building, so that they may mean any thing. Lithography soon superseded all kinds of engraving for architectural work, and by the time we are now speaking of had reached great perfection, as seen by the next books to which we will refer; viz., Joseph Nash's "Architecture of the Middle Ages," and his "Mansions of the Olden Time in England," dated 1838–39.

With reference to the so-called fac-similes of John Thorpe's drawings, given by Richardson, they are in chalk lithography, and by no means do justice to the originals, which deserve the closest study. Speaking of chalk lithography, the name of George Hawkins deserves a high place: his work in this style has never been surpassed. Continuing our notes we have to record the inauguration of our present professional press. Before doing so, a deceased relative who did good work for thirty years must not be forgotten. I refer to the *Civil Engineer and Architect's Journal*, which commenced its career in 1837, five years before the *Illustrated London News* first saw the light. Its illustrations were rough woodcuts for some time, but its later numbers were enriched with lithographs. The *Builder* was started under the editorship of Alfred Bartholomew in 1843, and it consisted of five pages of letterpress with no illustrations, taking more the form of a newspaper. The published price was threepence. Its first illustrations were of a very general character, but soon assumed a more strictly architectural form, giving wood-engraved views of buildings somewhat in the manner it has maintained ever since. The first instance of lithographic illustrations in a serial journal appeared in "Weal's Quarterly Papers," which were commenced in 1844. This work consisted of essays on various subjects of interest to the profession. The *Building News* published its first number in 1855; its illustrations were engraved by the celebrated Orlando Jewitt, whose wood-engravings of architectural subjects have never been surpassed in England. The first lithographs published in the *Building News* bear the date of 1860. A somewhat similar paper appeared in 1849, called the *Architect and Building Operative*, but it only lasted two years. Retracing our steps to 1845 we note the publication of Mr. Edmund Sharpe's grand work, the "Architectural Parallels," in two folio volumes, giving elevations, plans, sections, and views in a thoroughly technical manner. Prof. Willis was the first to apply color to indicate the several periods of English Gothic in the plans of churches, but to Mr. Sharpe we owe its further application to details: thus by referring to the plates of his works on mouldings, one can tell at a glance the periods of the specimens shown. In 1847 Messrs. David and Raphael Brandon published a most valuable series of books, drawn on zinc by the authors, excepting "Parish Churches," the plates of which were lithographed by J. K. Colling. These works are too well known to need description; and the same may be said of Mr. James K. Colling's beautiful books, commencing with "Details of Gothic Architecture," dated 1851. We have now reached the time when Continental Gothic began to attract attention. One of the earliest collections of drawings of this style is that found in King's "Study Book," in four thick volumes, bearing the date 1857, a former edition being published at Bruges. All the subjects are shown to the same scale, which has the fault of being too small — necessitated, no doubt, by the size of the larger subjects. Back-lining is employed, and the carving is not particularly well drawn. Mr. Norman Shaw's "Sketches on the Continent" were completed in 1858, Mr. Nesfield's "Specimens" following four years later. The influence of these "twin sketch-books," as they have been called, was, no doubt, very considerable in the impetus they gave to the then increasing taste for French Gothic and the more muscular forms of construction. This good work — for in one sense it was good, however much we may regret the continued neglect of the English styles — was taken up by Mr. R. J. Johnson, who published his book of "Early French Architecture" in 1864. Here, to my mind, we have the type of what an architectural sketch-book should be. The plates, all drawn and lithographed by the author, are almost exclusively devoted to measured drawings, with a few perspectives, chiefly in outline. The opinion of so eminent an authority on such matters as Mr. Burges is always worthy of consideration; but one cannot agree with him that perspective sketches are only suited for overgrown schoolgirls. An outline of the building as a whole is most essential, in order that the detail may be justly valued and appreciated; while an idea of the surroundings, with their local peculiarities, is of the utmost assistance, however slightly shown. That which looks well and suitable in one situation appears crude and lumpy in another; and again, that which is admirable in geometrical elevation may be very bad indeed in perspective. The modern French have neglected perspective, and we find their architecture flat and thin as a result. Among the many works of a more pictorial character, we may mention the magnificent etchings of Mr. Ernest George, the anastatic drawings of Sir Digby Wyatt, and the photo-lithographed pen-and-ink sketches from Italy by Mr. George Edmund Street. Before concluding this part of my subject, some of the numerous works on color decoration, illustrated by chromo-lithography, must be named, especially those by Owen Jones, J. B. Waring, and Sir M. Digby Wyatt. Their influence in forming and extending a correct knowledge of color has been of the widest kind. Among works of this class more recently published, Racinet's "Polychromatic Ornament" is conspicuous; and so is the "Keramic Art of Japan," by Messrs. Audsley and Bowes, now in progress. They were executed in France, and as specimens of gold and color work are superior to any thing I have seen produced in England without exception. With these my list of published works closes, although I have only briefly alluded to some of the more prominent English books.

THE ILLUSTRATIONS.

ILLINOIS ASYLUM FOR FEEBLE-MINDED CHILDREN, AT LINCOLN. MESSRS. FURNESS, LAING, AND FEHMER, ARCHITECTS.

(Cor. Dearborn and Washington Streets, Chicago, Ill.)

THE plans for this building now being erected were selected by the Board of Commissioners from several others submitted in competition. The State of Illinois appropriated the sum of $175,000 for its erection, and the building is well under way now to insure its completion by next spring. It is being built of red brick, and relieved with stone and white brick. The roof is covered with slate. Galvanized iron cornices and any superfluous display of ornamentation in the exterior as well as in the interior are scrupulously avoided; and it has been the principal aim of the architects to preserve the utmost simplicity in the design, with due regard to honest construction and honest use of the materials employed, in order to avoid any undue pretension in the character of the building. In the arrangement of the plan the centre part is for the accommodation of the various officers; it also contains in the rear a large chapel. The two wings contain the schoolrooms, hospitals, dormitories, gymnasium, and lavatories, for male and female children respectively. The culinary department is kept separate from the main building in order to prevent any disagreeable odor from entering the main building. This part is connected by covered passage-ways with the centre part as well as with the two wings. A hundred feet in the rear of the building is the boiler and engine-house with smoke-stack; the whole building is intended to be heated by steam. The general arrangement of the plan affords ample light and ventilation everywhere.

STUDIO FOR A. H. BICKNELL, ESQ., MALDEN, MASS. MR. T. GRIFFIN, ARCHITECT.

(172 Washington Street, Boston, Mass.)

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DESIGN FOR THE "OLD STONE CHURCH," CLINTON, N.Y. MR. FRED. H. GOUGE, ARCHITECT.

(Utica, N.Y.)

This is a design submitted for a Presbyterian church at Clinton, N.Y. It was proposed to build the walls and spire of a local sandstone, with wrought work of Trenton limestone; the roof to be open-timbered, finished with pine. Aside from the regular service, the church was to be used for the holding of college exercises; and the plan was so arranged that the chapel could be added to the audience-room by means of sliding doors underneath the gallery. The above requirement also modified to some extent the arrangement of the vestry, chancel, and platform. Church parlors were to be provided underneath the chapel. The building was to be heated by steam, and ventilated by means of a shaft heated by the smoke-flue from the steam-heater. The church was designed to seat one thousand persons.

DOES IT PAY TO EMPLOY EXPERTS?

AT Newport the sewerage question has been much discussed; and the city councils have awakened from time to time to a dull sort of comprehension of the idea that something must be done. Something has been done here and there; but it has been done with the sort of economy that is apt to prevail where "practical" men take charge of the public works of the community, and guard the treasury against all manner of extravagant expenditure, such as the employment of an expert to direct the extent and character of the work to be done.

Newport's last achievement is a sewer running from the Bath Road to Narragansett Avenue. This sewer has been built by days' work under the direction of the street commissioner, and according to a plan approved by the city council. The government and the commissioner congratulate themselves that the work has been done at less cost than it would have been by contract. This seems to be the case, and doubtless it has been well done. Its cost is given at $12,248.98. The lowest contractor's estimate was about $15,000.00.

The sewer is twenty-nine hundred feet long, thirty-six inches in diameter, and its wall consists of two courses of brick (an eight-inch wall). The area which will be drained into the head of this sewer is about sixty-five acres, nearly level land. It is an established rule among engineers, that the thickness of the wall of a sewer should be not less than one-ninth of its interior diameter, the wall of a three-foot sewer being four inches thick. It may even be questioned whether such a wall made of a single course of brick, and firmly held in a matrix of earth pressing closely against it from every side, is not more secure than when another and needless course of brick intervenes between it and its matrix. Certain it is, that three-foot sewers with four-inch walls carefully laid, and properly secured by careful filling are always and everywhere strong, permanent, and sufficient. The only exception to this rule, the only case where extra thickness is needed, is where the sewer lies so near the surface of the ground as to lack a sufficient binding weight of earth, and to be too much exposed to pressure from the surface.

In the sewer in question, the useless outer four inches of the wall contains about eighty-three bricks to the foot. At the prices paid for labor and material, the estimated cost of the work is $17.15 per thousand bricks, or $1.41 per foot of sewer, or $4,089.00 for twenty-nine hundred feet. To this should be added the increased amount of excavation and back-filling, and the greater trouble from quicksand and water ducts, the less rapidity of the work.

By gaugings in Providence, there have been eleven storms of one inch or more per hour in forty years. Such storms are usually short and sudden; and only a small part of their water finds its way to the sewer, even in paved and covered districts. When it rains all day, it is rarely that an inch of water falls within twenty-four hours. In suburban districts as nearly level as that at Newport, it would be much more than ample to provide for the flow of storm-water into the sewers of one-fourth inch per hour. This would equal about nine hundred cubic feet per acre per hour, or for sixty-five acres, 58,500 cubic feet per hour, or 975 cubic feet per minute. The capacity of the sewer as built is about twenty-two hundred cubic feet per minute; and the capacity needed as above would be given by a circular sewer twenty-six inches in diameter, laid on the same grade as the present one.

In view of the flatness of the grade of the whole water-shed above Narragansett Avenue, every requirement of prudence would be met by making one-half of the sewer twenty-four inches in diameter, and the last half thirty inches in diameter. The saving in masonry alone that would result from these deductions would be thirty-one cents per foot for one-half of the distance, and forty-five cents per foot for the remainder, or an average saving of thirty-eight cents per foot for twenty-nine hundred feet, equal to $1,102. The saving in excavation would be very material; and the rapidity of the brick-laying would greatly lessen the cost of pumping, shoring, etc.

The figures given show a total saving in masonry of $5,191. If we allow a little more than $900 for saving in excavation, back-filling, etc., we should have a total saving equal to just one-half of the cost of the work as done. Considering the character of the water-shed, and the grade of the sewer, it seems likely that the small sewer would cost less for cleansing and maintenance than would the one actually built.

The city authorities of Newport have avoided the criticism to which they would have been subjected had they paid a competent sewerage engineer two hundred and fifty dollars to lay out their work properly; and their economical neighbors, who would have made the criticism, will not be likely to look so deeply into the matter as to see that the saving of this expense has cost the city about six thousand dollars.

CORRESPONDENCE.

THE THIRD DISTRICT COURT-HOUSE INVESTIGATIONS. — THE BROOKLYN VERDICT.

NEW YORK.

THE week has brought out two reports which have been some time looked for by the public and those who are interested in building and architectural matters. The coroner's jury on the inquest held on the victims of the Brooklyn Theatre fire have rendered their verdict; and the committee in charge of the investigation of the Withers and Vaux charges have reported to the Common Council. Why an investigation should have been instituted by the Board of Aldermen into a matter in which they had no more than the interest of ordinary citizens is not known; but it offered an excellent opportunity on the part of the complainant to give notoriety to his claim for "extra work," and gratified his spite after a defeat in the courts. Many of the assertions against Messrs. Withers and Vaux were simply ridiculous, and no evidence was adduced in support; for instance, it was asserted by Cushing that both Withers and Vaux were insane.

The only appearance of a valid charge was on the practice which seemed to have existed in the office of these architects, on this work at least, of having bills of quantity drawn up; this was construed by Cushing into a system of blackmail or imposition; but the rebutting testimony of experts at the session of the committee made the matter so clear that in place of being a burden, several of the other contractors testified that the payment of ¾ of 1 per cent for these surveys and bills enabled them to estimate closer, and was actually a saving directly to themselves and indirectly to the city. These calculations and tables of quantities were not drawn up by the architects, and it was shown that they in no way profited by their preparation; but, uncontradicted, the charge looked very damaging, and so far answered the probable aim of the accuser.

The reports to the Board of Aldermen were a majority and a minority report; one finding that the architects were "remiss" in not condemning the unusual charge for bills of quantity, and the other explaining the relations of the accuser and architects, and putting the whole matter in such a light as to effectually expose the animus of the attack.

On the whole, the investigation seems to have resulted in a complete vindication of Messrs. Withers and Vaux, and to have shown that in their supervision of the Jefferson Market Court-House, they have bestowed upon the city of New York the best piece of architecture it possesses to-day, and, remarkable to say, at a cost less than the amount appropriated for the work.

The Brooklyn inquest has been most carefully conducted, though the influential citizens making up the jury failed to discover any facts of consequence not generally known through the press within a few days of the occurrence. After reciting the number of lives lost, &c., the verdict goes on to say, —

"That the said building, known as the Brooklyn Theatre, was constructed in a substantial manner, was admirably adapted for the purpose for which it was intended, so far as its modes of entrance were concerned, and also so far as its means of egress from parquet and dress-circle. There would, in our judgment, have been greater security for the safety of the audience if there had been a brick wall extending from cellar to roof, separating the stage from the auditorium, also hand-rails on each side of the stairway leading from the gallery.

"That the said fire gained headway and failed to be extinguished because of the inexcusable neglect of the management of the said theatre, which appears in these especial details:

"*First*, That there was no responsible head of the employees.

"*Second*, That there was no discipline among the employees.

"*Third*, That the appliances for the extinguishment of fire upon the stage or in the flies were wholly inadequate.

"*Fourth*, That the fire-hose formerly at hand had not been kept in place or use.

"*Fifth*, That the stage was overcrowded with scenery used in former plays, thereby rendering its condition extra hazardous, and adding to the volume of fire, if not directly the cause of it.

"*Sixth*, That the indifference shown in the neglect to recognize the danger from fire by providing proper appliances for its extinguishment when warned by the occurrence of two fires — one on the stage, the other in the box-office — but a week before the final destruction, constituted a violation of a most vital duty to the public, who were justified in confiding in the management for the utmost security in that regard.

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"That the business manager of the said theatre was guilty of a culpable neglect, in that the means of exit from the dress-circle to Flood's Alley, near Johnson Street, was so effectually closed as to resist the efforts of several persons who attempted to force it.

"That it is the special duty of managers of places to which the public are invited, to put forth every effort to secure their safety, and that the slightest degree of negligence becomes criminal when contributed by persons holding such relations to the public.

"Recognizing our grave responsibility as jurors on an inquest through which we have sought to discover the causes of the most disastrous calamity which ever befell our city, and, having discovered them, to fix the blame where it properly belongs, we feel that we would be wanting in the complete performance of our duty if we did not warn the public to demand of the proper authorities such legislative action as would hereafter, under severe penalties, assure greater security to life in the construction of buildings intended as places of public amusement, and so far as in their power prevent the occurrence of any similar disaster.

"Not being experts either in the building or management of places of amusement, we would be diffident in giving advice upon the subject, did the evidence before us not unanimously lead to the following conclusions:—

"*First*, In the erection hereafter of any building intended for theatrical purposes there should be a brick wall extending from cellar to roof, dividing the stage from the auditorium.

"*Second*, There should be two fire-hydrants on the stage, one on each side, at some convenient place; there should be one in the fly-gallery; there should be one in the front lobby, — to each of which hydrants there should be attached a proper length of hose, frequent examination of which should be made, so as to insure its being at all times ready for effective service.

"*Third*, There should be employees of theatres, whose sole duty should be to attend to these hose at all times when there was an audience in the building.

"*Fourth*, As a third gallery is attended with more than ordinary danger, not less than two wide and commodious stairways should be provided as a means of exit from it.

"*Fifth*, As a scientific discovery and experiment have demonstrated the possibility of rendering incombustible the material used for scenery, the use of any inflammable article for that purpose should be prohibited.

"*Sixth*, There should be hand-rails on each side of every stairway.

"*Seventh*, There should be iron fenders at intervals of not more than twelve feet upon all the border-lights, so that no portion of the scenery, whether through carelessness or accident, could come in contact with the wire which encloses the gas-lights."

There is a feeling that the coming season will be better than that of 1876 in the way of building on the part of capitalists. Griffith Thomas is to cover the valuable plat owned by Mr. George Kemp on Fifth Avenue and Forty-fifth Street with a great apartment house. Mr. Kemp, it will be remembered, has but just completed the Buckingham Hotel, a block or two farther up the avenue. The Trinity altar-piece for the Astor Brothers is getting on: several of the statues have arrived from England, and the construction of the Caen-stone work is in every way satisfactory. Upon its completion, the designer will issue a volume of enlarged photographs of the several parts, illustrating the carving and modelling on the work.

RESPONSIBILITY FOR BAD BUILDING.

TO THE EDITOR OF THE AMERICAN ARCHITECT.

Dear Sir, — With reference to the "accident" (?) in consequence of bad building, quoted in your last issue from English papers, and in which the responsibility seems to have been laid where it (perhaps) justly belonged, — on the *builder*, as no architect appears to have been employed, — will you allow me to ask on whom the responsibility would have rested in such a case, in this State; and on whom it would have rested *had* an architect been employed?

Also, can you say with confidence, that could such an "accident" be directly traced to bad building or inferior materials, it would be followed by "an accusation of manslaughter" against the responsible party, in our courts, and punished as such?

Again, let me suppose another case. Suppose one or more workmen engaged on a building, or a person passing by, should be killed or injured by the falling of a derrick or a staging insufficiently strong: would such an "accident" with us render the party responsible subject to "an accusation of manslaughter," and would he be likely to be punished accordingly? Also, in the latter instance supposed, who would be responsible in case an architect was employed to superintend the building, — the architect or the builder, or possibly the proprietor, especially if no architect was employed?

I am induced to ask these questions mainly by your paragraph referred to; but its reading recalled to my mind several "accidents" — so called — that have occurred from time to time in the erection of new buildings in this city, and I am exceedingly doubtful whether in those instances any one was found responsible and punished for unnecessary destruction of life or limb.

I will just mention the three or four fatal "accidents" that have occurred during the erection of the new Trinity Church, to workmen employed on that building.

It seems to me that in the English case under consideration, and perhaps in all cases, the proprietors of the building should be held civilly and criminally responsible. This would be the most effectual means of protecting the public, and especially the workmen employed, from unscrupulous builders and incompetent and neglectful architects. Oftentimes neither the architect nor the builder is financially responsible, whereas the proprietor may be generally supposed to be so; and his defence would be to employ only competent and trustworthy persons, and bind them by their contracts to a faithful performance of their duties.

Such a method of reducing building "accidents" to a minimum would be the best for the public, and also, in the long run, best for architects, builders, and workmen, and all concerned.

It is the more necessary in these days of "cheap and nasty," because so many erections are put up — I can't say built — by mere speculators, whose end is accomplished if they will only stand until they are sold. Great is competition.

BOSTON, Jan. 27, 1877. W. G. H. SMART.

[WE should expect that if such a thing happened in this State the responsibility would rest upon the person to whose neglect or misconduct it could be traced. We do not think the law is so fixed here as to assign definite degrees of responsibility to proprietor, architect, or builder. If an architect were employed, his responsibility would have to be determined by general considerations, we suppose, in the absence of either definite enactment or precedent to cover the case. We doubt whether an action of manslaughter would be brought here in any such case; and if it were, whether any jury could be got, in the present state of the law, to convict. What we had in mind was the passage of some specific law which should make either proprietor, architect, or builder, to whomever the fault of bad building could be traced, liable to the penalty for manslaughter in case of fatal casualty resulting from it. In the *Architect* for the month of July, 1876, will be found several articles on the responsibility of contractors for accidents that befall their workmen. — ED. AM. ARCHITECT.]

BOOK NOTICES.

A BOOK[1] before us bears the imprint of G. P. Putnam's Sons; but a glance through it shows it to be an English book, printed in Glasgow, and concerning itself only with the methods of building which are practised in Great Britain. Looking at the list given on its fly-leaf of the "Advanced Science Series" to which it belongs, we find that all the two dozen volumes of the series are of English authorship. We do not quite see why Messrs. Putnam should have chosen to print for the American market an English treatise on a trade in which the methods of the two countries differ so widely as they do in the building trades; though it is quite true that the knowledge of the methods of one country is not amiss in another. Nor do we see why the publishers, if they wish to publish such a work, should have fixed on Mr. Burn's — unless it were because they knew of no other; nor, in fine, with what propriety the title of civil engineer can be attached as it is in the announcement of Mr. Burn's works, to the name of a writer who shows himself unfamiliar with common geometry. The book is neatly issued, and consists of a small duodecimo volume of text with cuts, and a small quarto of lithographic plates. The student will find in it a good many useful descriptions of the practical processes of building, not very well digested, and omitting many things that it is necessary to know on this side of the water, as well as neglecting many points which ought to be considered anywhere; slurring some, while others are dwelt on with great detail. For instance, fifty pages or so are given to a minute account of various bonds in brickwork, while of the method of laying it and the necessary precautions, hardly any thing is said. The chapter on mortars is very slight, and gives little information as to manipulation, strength, or the effect of weather and frost. In speaking of piling for foundations, nothing whatever is said of the method almost universally used here of capping the piles with a layer of hard stones; and in the chapter on drains, earthen pipe is barely alluded to, and cement pipe not mentioned. Room might easily have been made for these and other things by omitting some of the useless matter; for instance, the introductory chapter on drawing.

There are a good many quotations from writers who are better masters of their subject than Mr. Burn: in fact, we may say that the extracts are the most interesting part of the book. In his geometrical and scientific allusions, the author talks at random, as when he says that a drawing-board is "rectangular, that is, having a greater length than breadth;" or defines a right-angled triangle as one in which the hypothenuse is at an angle of 45° to the base, and a plan as "the projection of any body taken on a line parallel

[1] Building Construction: showing the Employment of Brickwork and Masonry in the Practical Construction of Buildings. By R. Scott Burn. 2 vols., text and plates. New York: G. P. Putnam's Sons. (Putnam's Advanced Science Series.)

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to its base;" or says that the "line of rupture is the angle at which materials slip," etc. "Blocking-cornice" for block-cornice, and "transitive" style for transitional, may be slips, but a jamb "moduled or moulded" can hardly be so. There are things worth the student's knowing in the book, but we cannot recommend him to take it for a manual.

CHICAGO.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — I am just in receipt of a copy of a work on roof-trusses, that I have so often felt the need of that I am sure it will be welcomed by all architects. It is entitled GRAPHIC ANALYSIS OF ROOF TRUSSES, for the use of Engineers, Architects, and Builders; illustrated by three folding plates. By Charles E. Greene, Professor of Civil Engineering, University of Michigan. George H. Frost, publisher, Chicago.

It first appeared as a series of articles in the *Engineering News*, where it first attracted my attention. I soon became satisfied that it supplied a want, long felt, of having at hand in the office the necessary data and methods of readily calculating by the graphic method all the roof-trusses that were likely to arise in an architect's practice. But as the form scattered through several numbers of a journal was inconvenient, and knowing Mr. Greene very well, I often urged upon him the advantages that architects might derive from his researches if he would only have them published in a book form. This he promised to do, but it has from different causes been delayed until now. The work, which retails for $1.25, only contains some 64 octavo pages, and three sheets of diagrams; will be found not only accurate, but, what is equally essential in a work of this kind, all the methods are of easy application. Of this, however, all who know Mr. Greene's happy faculty of combining thorough scientific analysis with clear practical applications will have no doubt.

The table of contents will give some idea of the scope of the useful little work: —

Introduction; General Principles; Trusses under Vertical Forces; Trusses with Horizontal Thrust; Trusses with Flat Roof; Forces not applied at Joints; Wind Pressure; Bending Moment and Moment of Resistance; Load and Details.

The examples include, besides all the more usual roof-trusses, the hammer-beam truss so often used in church work.

The book sells for so small a price, and is of so much assistance whenever it is a question to design a roof-truss, that I venture to recommend that it should be in the office of every architect.

Very respectfully, W. L. B. JENNEY.

[We have received Prof. Greene's little treatise, and need only indorse what we said (see Vol. I. page 65) of the papers at the time they appeared in the *Engineering News*. — ED.]

BOOKS RECEIVED.

A Practical Treatise on Heat, by Thomas Box. E. & F. N. Spon, London and New York. Price, $5.00.

Architectural Surveyors' Hand-Book, by J. T. Hurst. E. & F. N. Spon, London and New York. Price, $2.00.

Fires in Theatres, by Eyre M. Shaw. E. & F. N. Spon, London and New York. Price, 50 cents.

Report of the Inspector of Buildings for the City of Boston, Mass.

Proposed Building-Law for the City of Providence, R.I.

The Graphical Analysis of Roof-Trusses, by Prof. Chas. E. Greene. G. H. Frost, Chicago, Ill. Price, $1.25.

JOURNEY OF AN ARCHITECT IN THE NORTH-WEST OF EUROPE. — IV.

THE SYNAGOGUE AT HANOVER.[1]

THE most important modern ecclesiastical building in Hanover is the new synagogue, the architect of which is Mons. Oppler.

The synagogue was anciently the place where the Jews met to pray, to read and expound the sacred Scriptures. This custom has not been changed; and the Hebrew worship, after the lapse of three thousand years, requires no modification of the arrangement according to which the temple of Solomon was built. It seems therefore, at first sight, that the plan of this temple ought to have been adopted for all synagogues in every country; but the requirements of different climates are not the same. It was necessary to plan an edifice which by its form, its character, and the system of its construction, is adapted to present circumstances, and at the same time in accordance with the traditions which it must recall, and the fundamental principles which it must transmit. Synagogues, vary therefore in form as much as in architectural disposition.

The ground-plan of the Hanover synagogue [fig. 106] is conformable to conventional notions. It assumes the form of a rectangle; but the greater width to the right and left of the nave would unfortunately recall the idea of the cross, were it not that this transept is so disposed as to present, with the prolongation of the nave and the choir, a vast central division, which, correctly speaking, forms in itself the main portion of the building, divided from the aisles by arches springing from isolated pillars.

Before the entrance, which is at the west end, is a porch, to which open the staircases leading to the galleries; the vaulted roof

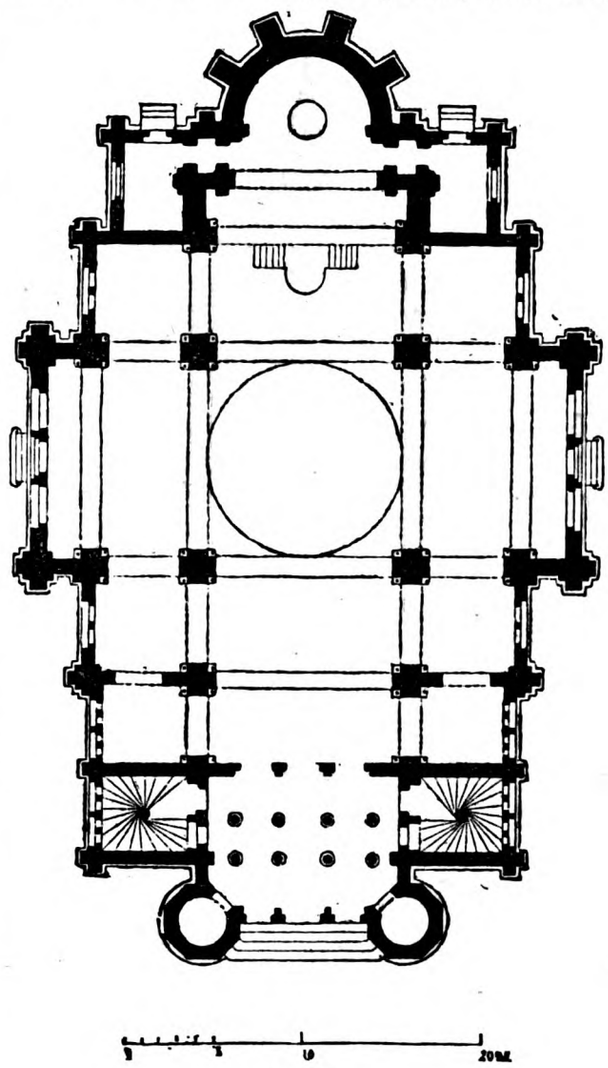

Fig. 106.

of this porch is supported by twelve columns, intended to represent the twelve tribes of Israel. Beyond the nave or *holy place*, is the sanctuary or *holy of holies*, placed at the east end. In the central part, a large cupola rises higher than any other part of the building, and symbolizes the idea of the unity of God.

Near the sanctuary there are two vestries, to the right and left; and at the entrance are two other rooms. In the large space on the ground-floor are raised seats reserved for men, and on the first floor those allotted to women. Within the choir are the stalls of the grand rabbi, of the members of consistory, and of the administrative commission. In front are the pulpit, the seven-branched candlestick, and the traditional lamp; in the apse, the ark or chest, a souvenir of the ark of the covenant, in which the Jews keep the five books of the law of Moses, written by hand on vellum, and rolled up in the ancient manner.

We may notice among the architectural details of the interior [fig. 107] the large arches of the nave, which occupy its whole height from the ground to the roof, without being cut by lower arches intended to support the galleries. These remind one of the ancient churches in Westphalia, in which the aisles were always as high as the nave. The galleries are sustained on pillars and consoles of wrought iron, and seem to be independent of the structure, so that they might be removed without making any other change in the disposition of the building. This is perhaps a fault, but, on the other hand, the plan adopted is novel; it increases the elevation of the vaults, since no combination of details interferes with their height. The cupola is supported on four squinches, formed of retreating arches successively lessening as they recede. The rest of the building is covered with groined vaults with projecting ribs. The whole has a comfortable and rich appearance, which will be still more augmented by the decorative parts, which are far from being finished at the present time.

This synagogue is built of freestone, as well as brick, wood, and iron. This is one of the few buildings in Hanover in which we have noticed the employment of iron. Its use has been so well

[1] Printed by permission from the advance sheets of a Journey of an Architect in the North-west of Europe. Translated from the French by M. Felix Narjoux. James R. Osgood & Co., Publishers.

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understood, and it has here been employed in forms and combinations so appropriate to its nature and to the part which it plays in the construction, that it is evident that its unfrequent application is not owing to Hanoverian architects not knowing how to

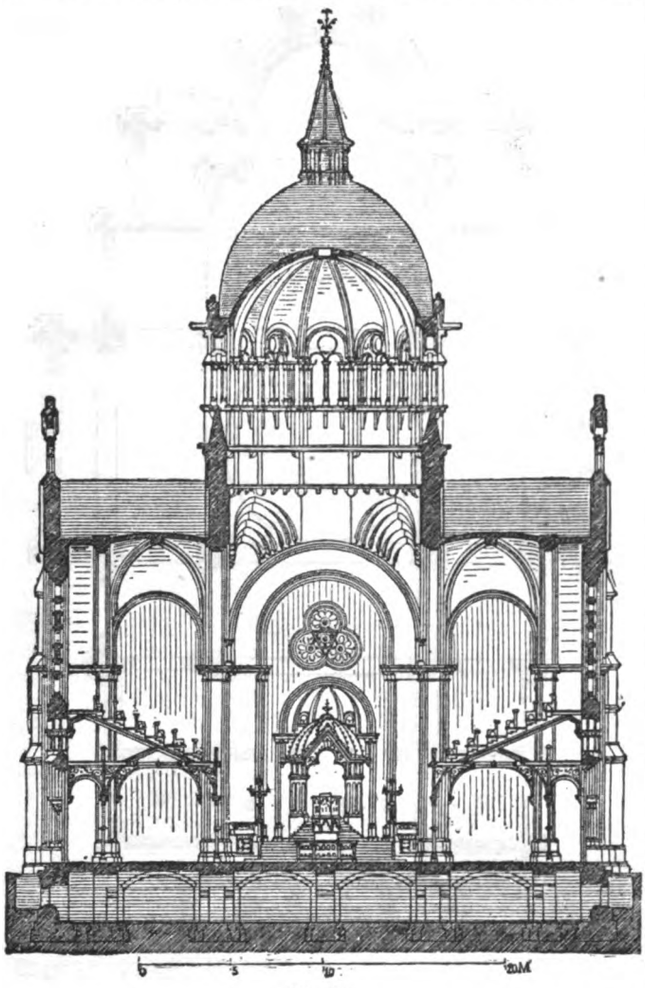

Fig. 107.

employ it with effect. It rather depends on the influence of wise economical views which cause timber to be preferred to iron, since the former is still abundant in the country and comparatively cheap.

NOTES AND CLIPPINGS.

THE BARTHOLDI CENTENNIAL FOUNTAIN. — M. Bartholdi has once more given evidence of his generosity in offering to the United States Government the bronze fountain which during the exhibition stood between the Main Building and Machinery Hall, for $7,000 — said to be the cost of the bronze alone.

THE PROPOSED NATIONAL MUSEUM. — The chairman of the Centennial Committee has prepared a bill appropriating $250,000 for the erection of a building to receive the articles presented to the Government by foreign Centennial exhibitors. Quartermaster-General Meigs has prepared plans for such a building, which shall be placed upon the grounds of the Smithsonian Institute.

PANIC IN A CHURCH. — On the evening of the 1st inst., a panic was caused in a church at East Columbia, O., by the giving way of a retaining-wall four feet high, which was built to retain a hillside. In its fall it struck against the side of the church with such noise and violence as to produce the impression that the hillside had given way and was carrying the church before it.

OLD CHURCH REMODELLED. — A correspondent writes us that at Delhi, N.Y., St. John's Church, an old-fashioned but shapely building. has been remodelled with great success from the design of R. M. Upjohn, Esq. The interior is very striking, and the chancel is especially beautiful in design and coloring. Pews, wainscoting, columns, and external features, porches, etc., are all new. Rich memorial windows have been put in, and all unsightly remnants removed. Strict adherence to the architect's plans has resulted in complete satisfaction.

THE STRASBOURG CLOCK. — A fac-simile of the famous Strasbourg clock is on exhibition at 224 Broadway, South Boston, Mass. The clock is a wonderful piece of mechanism, and was made by a young German, who took seven years to build it. It possesses all the features of the greater one.

THE STONE KETTLES OF KENTUCKY. — A correspondent of the Cincinnati *Enquirer*, writing from Hillsborough, Ky., describes these strange utensils, the supposed work of the prehistoric inhabitants of America. After passing through an oak forest, and climbing a steep hill which was remarkable for the absence of rocks on its surface, he found the lid of one of them, and shortly afterwards found the kettles. At one time there must have been about a dozen of them, but now only four of them are preserved. The roots of trees growing near by have split some of them, and other causes have helped further their destruction. The kettles are hewn into the soft sandstone, but exposure has removed all traces of chisel-marks. He saw a few scratches, but they seemed to have been made by recent explorers. Each of the kettles was about five feet in diameter, strictly circular, and two feet in depth. A bevel is cut on the edges to receive the lids, several of which lie near by. Upon the upper edge of several of the kettles a groove has been chiselled into the rock, seeming as if, after the lid had been put on, cement had been used to exclude moisture. The lids lie near by, with one exception. They are large pieces of sandstone, of a circular shape, the under side flat and the upper hewn to an oval shape. All the work about these lids, and the kettles, is smooth and well done. To have placed the lids on the kettles must have taken the work of a number of men, for they are quite heavy. Three of the kettles, that are in a good state of preservation, are situated on an arc of a circle whose diameter is about forty feet. The two farthest apart of the three have a distance of about twenty-five feet between their centres, while the remaining one is situated midway between them on the arc of the supposititious circles passing through their centres. From the regularity of the positions of these three, and the general position of the remaining ones, it would appear that they had all been arranged in like groups of three. Two of the groups are on the same level, and the remaining groups were on a parallel level. The kettles are placed on the side of a hill, having about the same angle as its slope. Further, they are so placed that they are exposed to the sun for the longest possible time.

DRAWINGS OF THE MOUND-BUILDERS. — Not far from Davenport, Io., have lately been discovered, at a depth of five feet from the surface, and covered with a stratum of white yellow clay, two coal slabs, — one of them an inch and a half thick, and about one foot square, and the other six inches square, covered on both sides with figures and animals and birds of extinct species, and drawings which have puzzled the members of the Davenport Academy of Science. On one there can be traced some fourteen figures surrounding a fire, hands joined. On one side of the fire, within a circle, is a figure lying on the ground, supposed to be a dead body. On the other side are two similar figures. In the right-hand upper side is a circle, about an inch in diameter, said to represent the sun. On the left-hand side on the same line is another circle, supposed to represent the moon. Outside the circle of fire-worshippers are, covering the whole slab, small figures of birds and animals, among them one larger figure, which Dr. Farquharsen says undoubtedly represents the mastodon. Another slab, six inches square, has three circles, one within the other, the outer one as large as the face of the slab will allow. Between the first and second circles are characters at equidistant points, corresponding to what would make the quarter-hour on the face of a clock-dial. Between the outer and second circles are twelve characters at distances corresponding to hour-figures on a clock-dial. Outside of the outer circle and dispersed all over the face of the slab, are figures and signs. It is thought that the interpretation of these inscriptions can be arrived at by the aid of data in possession of the Davenport Academy of Science.

BRICKLAYERS' STRIKE. — The latest information we have states that the strike at the Messrs. Doulton's still continues, as they persist in employing the "two plasterers" who are aided in their work by non-union men.

A STRONG-ROOM. — Messrs. Chubb & Son, the lock and safe makers, have just made a strong-room for a London bank. It contains a lobby in which will stand several iron safes. The remainder of the room is divided into two strong compartments for storing bullion, jewels, securities, etc. The outer door, which weighs nearly a ton, is made of wrought iron and hard steel, and is secured by two locks which throw bolts on all four sides. The room measures twenty feet by twelve feet, is nine feet high, and weighs about twenty-three tons. It is put together from the inside, so that no screws shall come through the outer plates. The plates are made to overlap, so that no straight joints exist. It took the Messrs. Chubb three months to construct this strong-room.

ÉCOLE DES BEAUX-ARTS. — The Minister of Fine Arts has at length obtained possession of the buildings on the Rue Bonaparte, Paris, adjoining the court-yard of the École des Beaux-Arts, at present occupied as a *succursale* of the Mont de Pieté (government pawnshop). They, or more probably their successors, are to be used as an additional museum, as the collections are already too large for their present quarters.

A PATTERN BOOK. — A book called *Kunstgeschichtliches Musterbuch* is now publishing in parts at Frankfort-on-the-Main, the author of which is Herr Fr. Christmann. It consists of large chromo-lithographic plates illustrating architecture, sculpture, painting, and the manufacturing arts. It is intended to serve chiefly as a pattern book.

GLASS VENEER. — Among the latest of the so-called improvements in the cabinet-maker's trade is the invention by Mr. Budd, of New York, of glass veneers, which are said to be good imitations of the woods they represent. The chief advantage of this new invention is that such veneers wear better than true wood veneers. Mr. Budd has had in use for more than two years a pianoforte covered with glass veneer, which has been moved three times without breakage or suffering damage by scratches.

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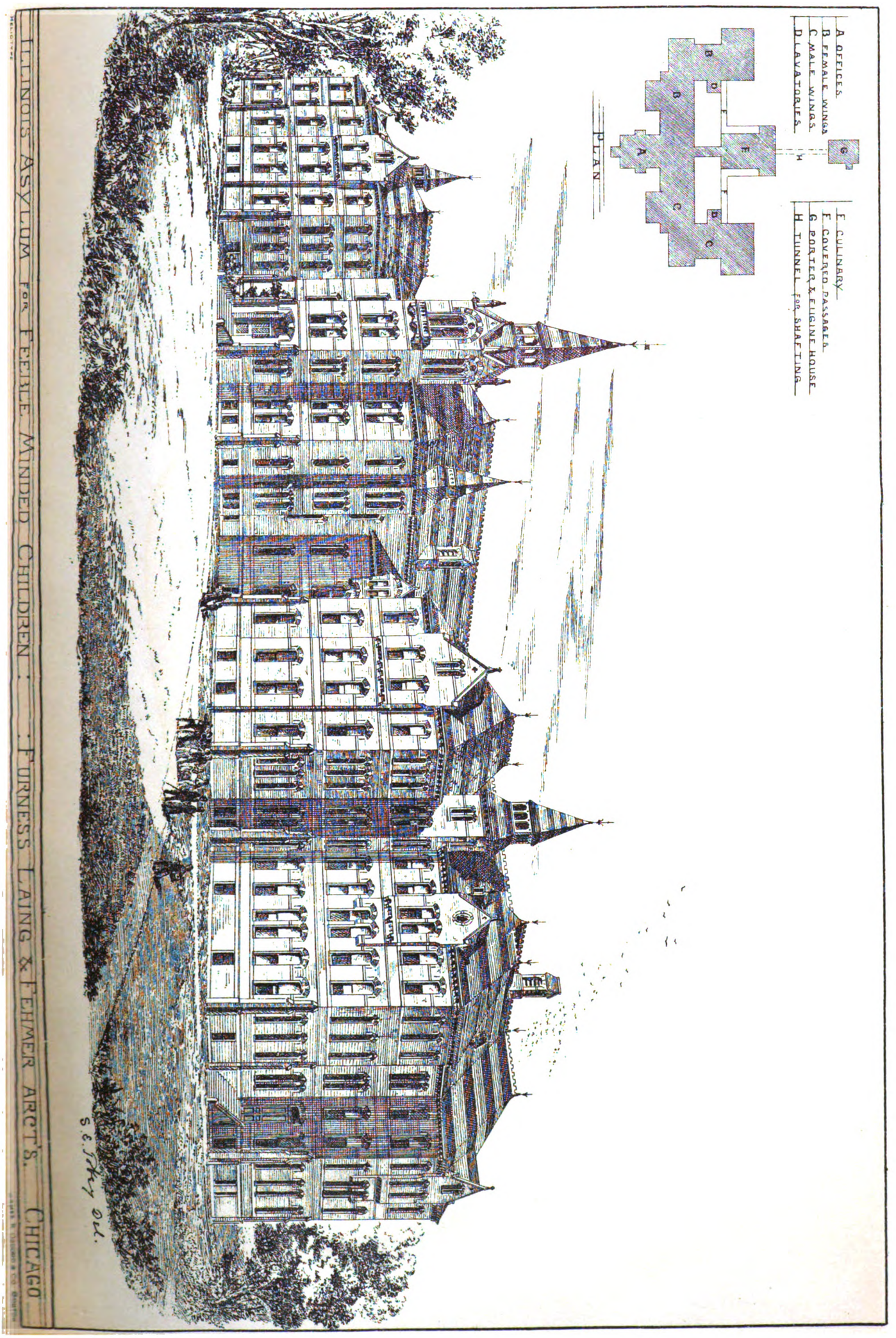

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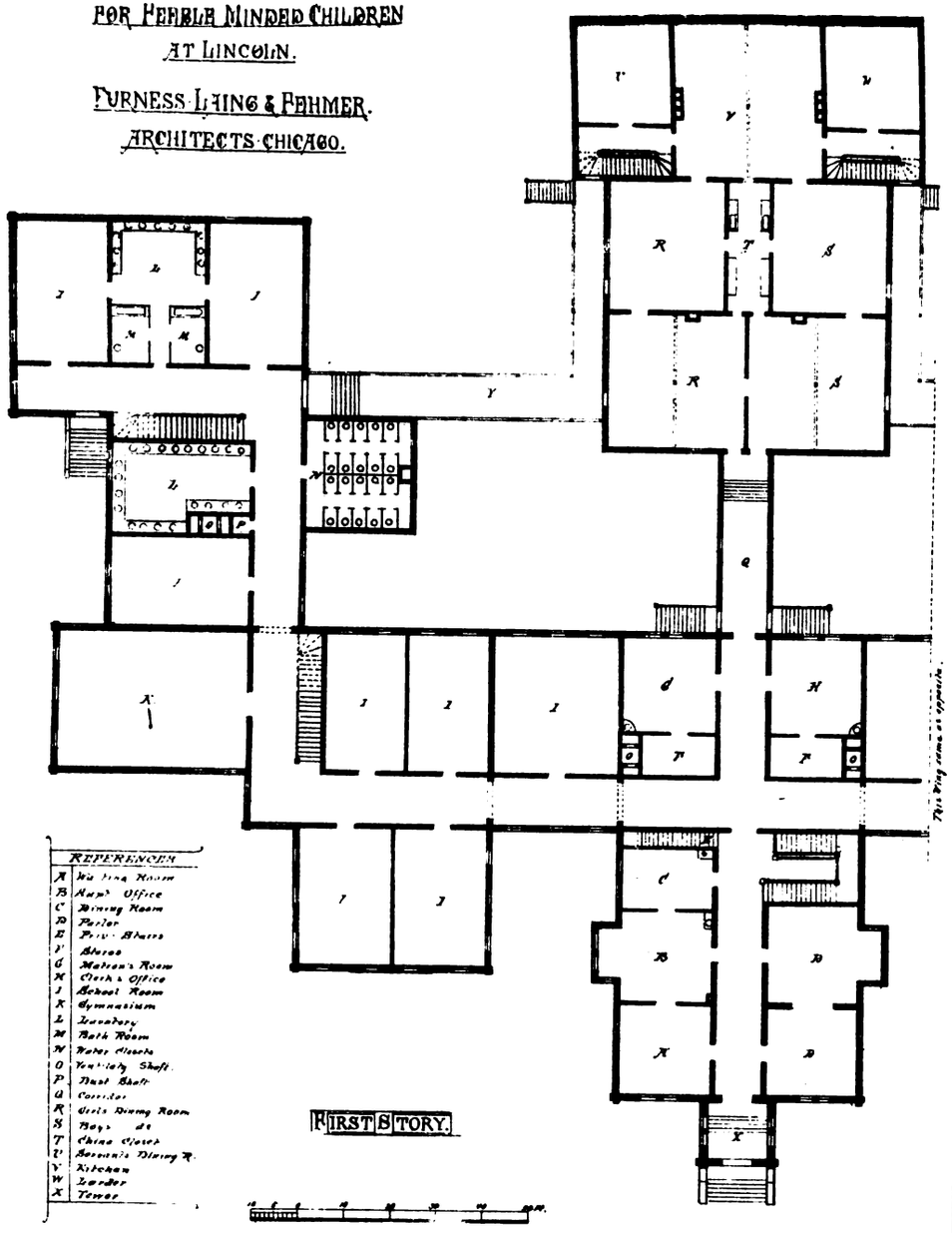
ILLINOIS ASYLUM
FOR FEEBLE MINDED CHILDREN
AT LINCOLN.

FURNESS, LAING & FEHMER.
ARCHITECTS, CHICAGO.



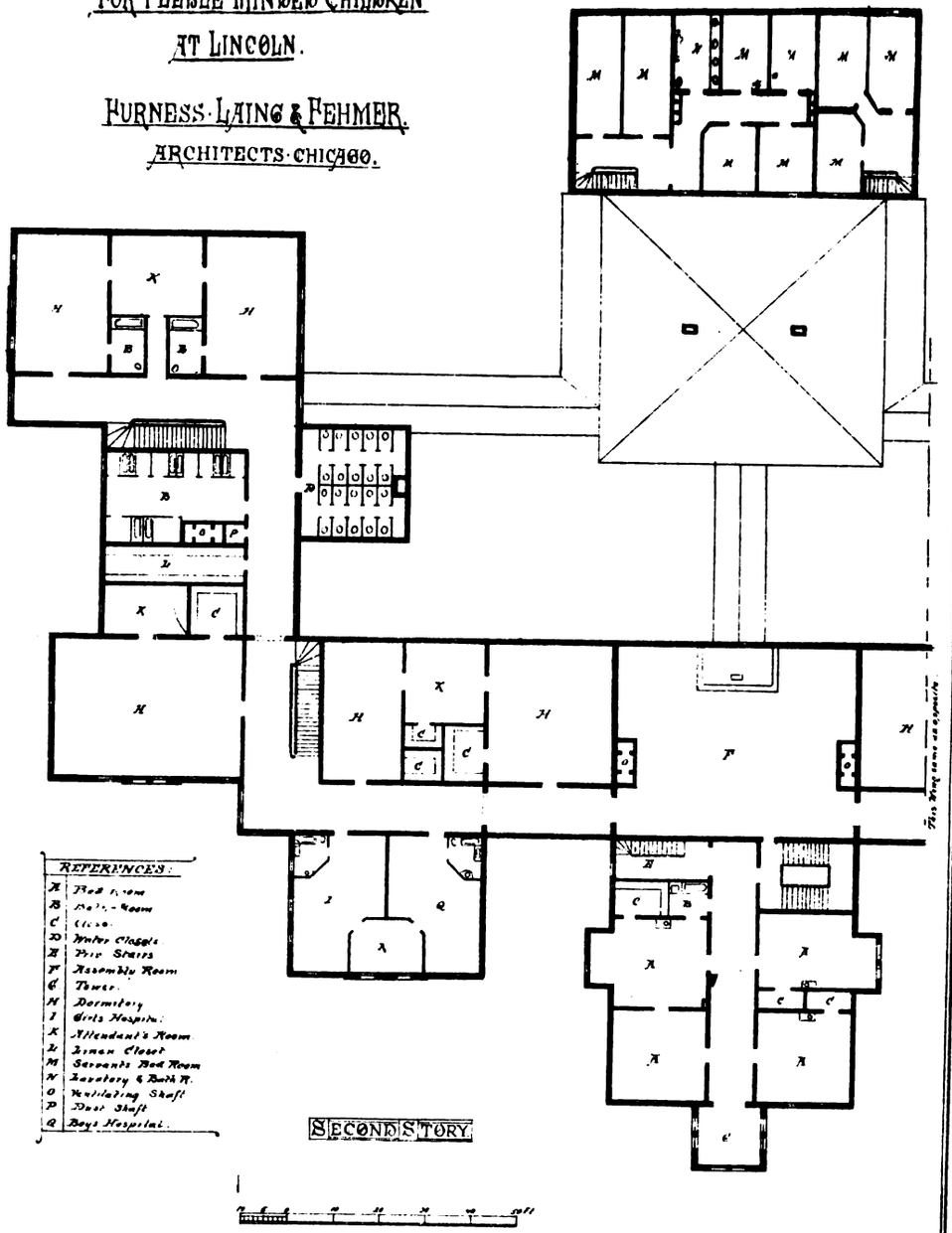
REFERENCES

A	Waiting Room
B	Supt's Office
C	Dining Room
D	Parlor
E	Prin. Stairs
F	Stores
G	Matron's Room
H	Clerk's Office
I	School Room
K	Gymnasium
L	Lavatory
M	Bath Room
N	Water Closets
O	Ventilating Shaft
P	Dust Shaft
Q	Corridor
R	Girls Dining Room
S	Boys " "
T	China Closet
U	Servant's Dining R.
V	Kitchen
W	Larder
X	Tower

FIRST STORY.

ILLINOIS ASYLUM
FOR FEEBLE MINDED CHILDREN
AT LINCOLN.

FURNESS, LAING & FEHMER.
ARCHITECTS, CHICAGO.



REFERENCES:

A	Bed Room
B	Bath "
C	Closet
D	Water Closets
E	Fire Stairs
F	Assembly Room
G	Tower
H	Dormitory
I	Girls Hospital
K	Attendant's Room
L	Linen Closet
M	Servants Bed Room
N	Lavatory & Bath R.
O	Ventilating Shaft
P	Dust Shaft
Q	Boys Hospital

SECOND STORY.

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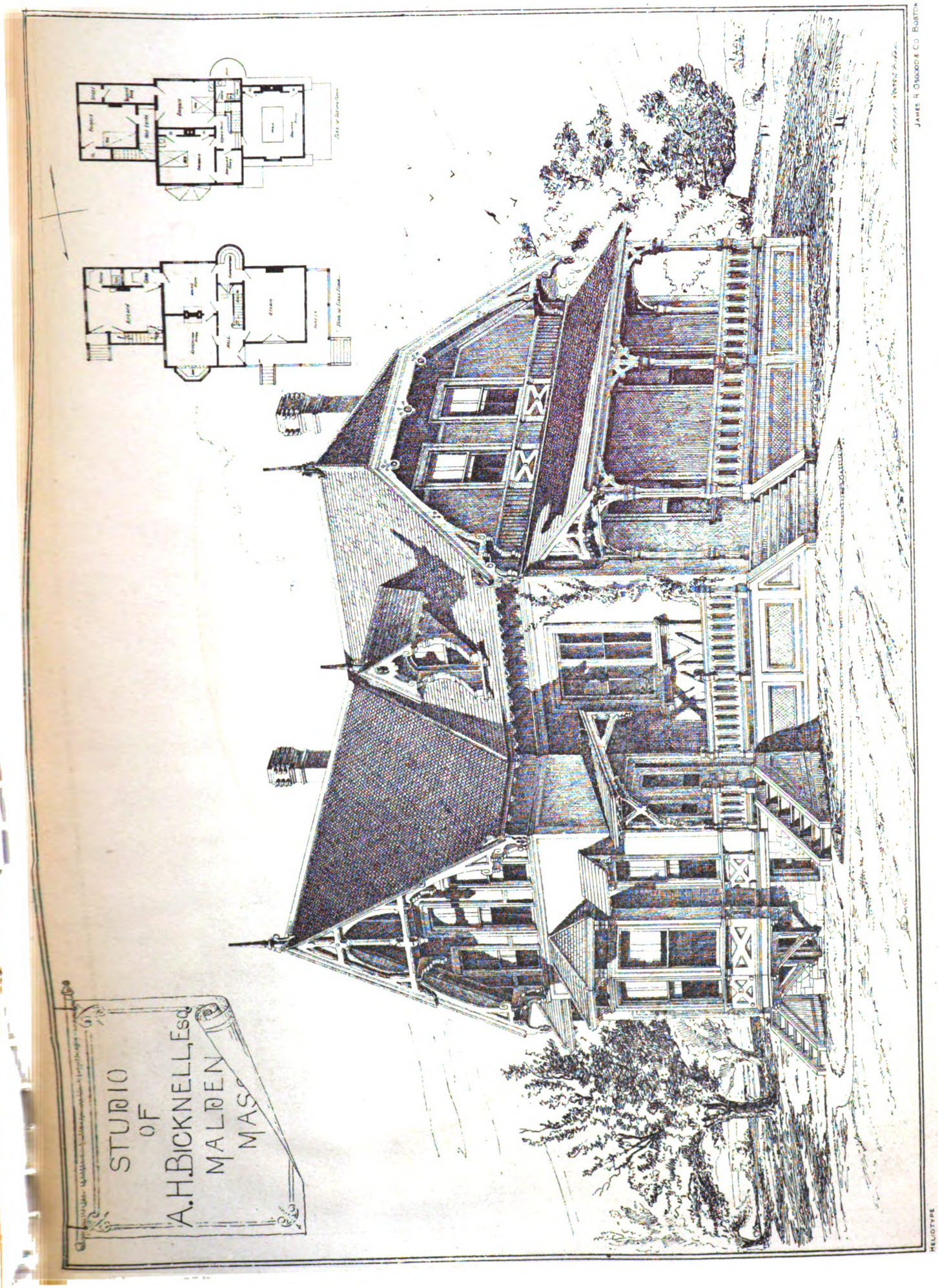

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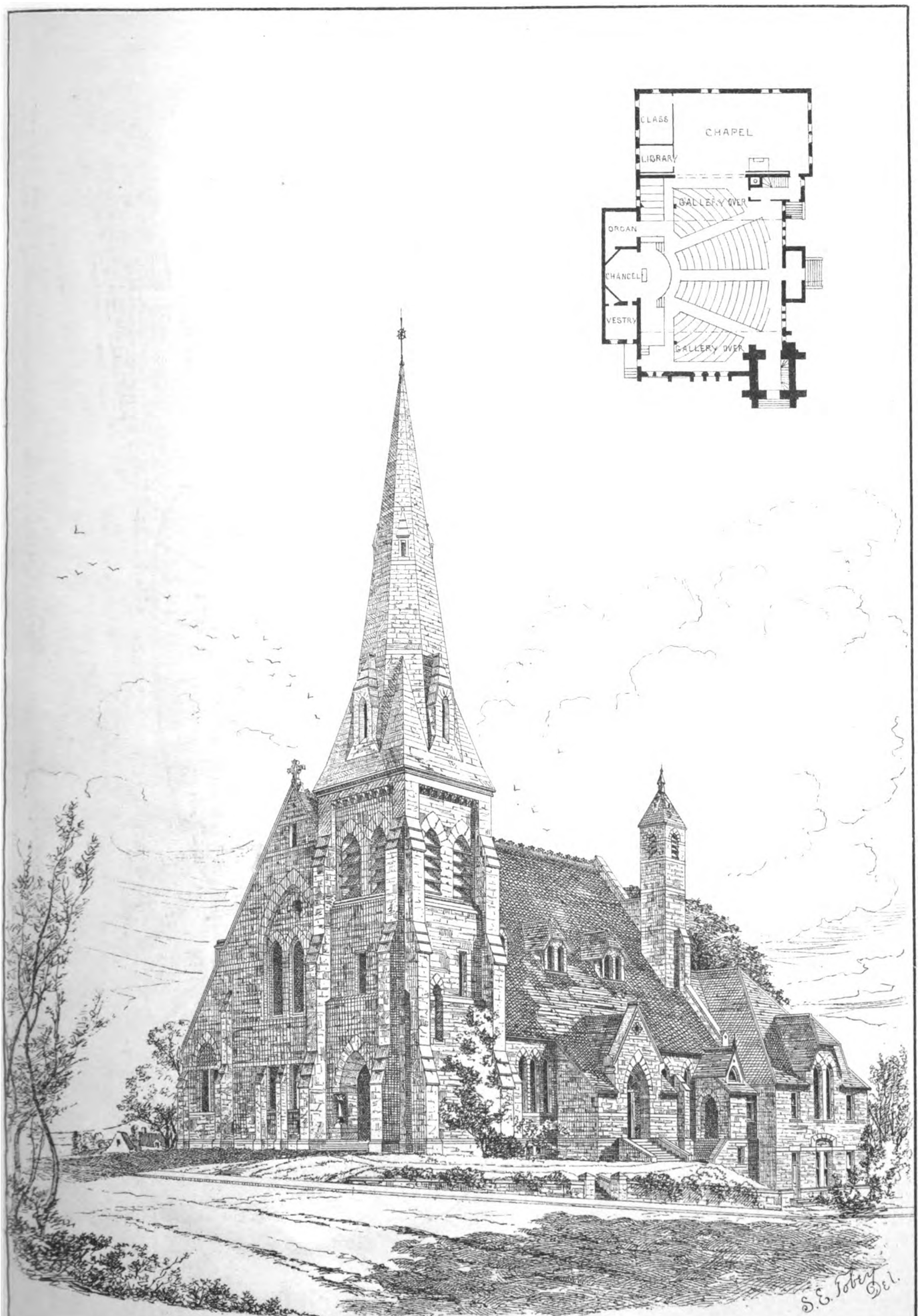

DESIGN FOR THE "OLD STONE CHURCH" CLINTON N.Y. F.H.GOUGE ARCH'T.

JAMES R. OSGOOD & CO. BOSTON

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. II.] Copyright, 1876, JAMES R. OSGOOD & CO. [NO. 60.

BOSTON, FEBRUARY 17, 1877.

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WE have received a copy of the Building-Act prepared for the City of Providence by the Rhode Island Chapter of the American Institute of Architects, at the request of the City Council. It fills a pamphlet of sixty octavo pages, and has evidently been prepared with unusual care. We are impressed in reading it over, with the thoroughness with which all the essentials of building have been considered, so far as they are subjects for municipal control, — so much thoroughness, in fact, that a copy of this proposed act would be no bad manual of building for an architectural student. The main points covered by the law are of course such as are covered by most of the building-acts of American cities; and there is no need to attempt a synopsis of them. But in many points the precautions of the act reach further than is common with us; and though it is not brought to the standard that would be thought necessary in a Continental European city, it makes a considerable advance on our ordinary methods of building, and, we suspect, is on the whole a little before any that are in force in the country.

THERE is a large manufacturing population in Providence; and for this reason, we suppose, special attention has been given in the act to the control and construction of tenement-houses. They are required to be of brick or stone; and much care is taken to compel a reasonable amount of light and ventilation for them. Where they abut on streets not more than twenty feet wide — we hope there are not many such in Providence — they are not to exceed thirty feet in height; and where they stand on the same lot with other buildings, in front or rear, there must be a space of not less than ten feet between the buildings, or more in proportion to the height, if they are of more than one story. They are required to have at least one chimney for every tenement or set of rooms; their stories must never be less than eight feet high; half at least of every attic room must be of this height — it must have at least one outside window, and a ventilator over the door; the top of the window must be at least seven feet above the floor, and must open. Every room of less than one hundred feet area, if it has not an outer window or an open fireplace, is required to have a special ventilating shaft to the roof, or other equivalent provision. It is forbidden to let or occupy for a lodging any underground room which has not been so let before the passage of the act; nor any such room whatsoever, unless it is at least seven feet high and one foot above ground, and unless it has an area of two feet wide in front of it, extending down to below the floor level. The owner or lessee is required to whitewash the walls and ceilings twice a year. The act prescribes the rule recommended by the Superintendent of Buildings of Chicago, that plans of all theatres, halls, churches, schools, and other places of public assembly, showing their seating capacity, means of ingress and egress, and of extinguishing fires, shall be kept on file in the department of buildings, and shall be always accessible to the public. We notice among the provisions which here and there show the care with which the subject has been considered, that no building is to be allowed to be used for any wood-working factory or shop unless it has a fire-proof vault, or bin, into which the shavings, sawdust, and other inflammable refuse shall be swept every night; that all stud partitions, and spaces behind furring, are ordered to be filled with brick, concrete, or plaster, for the whole thickness of each floor, and six inches higher; that the weight to be provided for in flooring different classes of buildings is fixed by the law, and no floor is to be allowed to carry more than its appointed load, unless on certificate of its strength from a competent architect or engineer; and that the architect who builds a storehouse or warehouse is required to give a certificate of the weight with which its floors may safely be loaded. The act, it is true, exists as yet only on paper. It is to be hoped that it will not be altered out of its efficiency in going through the legislature.

THE State Commissioners on the new Capitol at Hartford, Conn., which is now building from Mr. Upjohn's designs, have submitted to the governor of the State their report for the past year, from which it appears that the whole amount thus far expended on the building has been about one million four hundred and twenty-five thousand dollars. The marble-work of the exterior is nearly finished, and the greater part of the roof on. The main tower has been brought up to the roof level, and the cupola will be begun in the spring. Nearly all the brick floors are in, the columns and girders for the gallery of the representatives' hall are in place, the finishing of the senate chamber is begun, and several of the rooms are ready for plastering. The steam, water, and gas pipes are in; the boilers (four of fifty horse-power each) for heating the building have been set in a vault outside, and are working satisfactorily. The committee report that thus far the work has been kept within the estimates. They wisely deprecate an effort to finish the interior of the building hastily, and do not commit themselves to having it ready for use at the end of the present year. The crowning figure for the dome has been contracted for with Mr. Randolph Rogers of Rome. The statue is to be of bronze, and will be cast, like most of our bronze statues, in the royal foundry at Munich. Mr. C. B. Ives, a Connecticut sculptor now in Rome, has received a contract for the statues of Sherman and Trumbull, of heroic size, which are to stand over the east entrance. Negotiations are in progress for the twelve statues which will crown the pinnacles at the springing of the dome. The fall in prices of building has enabled the commissioners to cover the cost of this statuary with the appropriations already made for the work; and they are confident that except for some of the sculpture, which it was expected would be supplied from time to time after the building was done, the cost of the whole building can be kept within their former estimate of two millions and a half.

THE new Trinity Church in Boston (Messrs. Gambrill and Richardson, architects), consecrated last week, is perhaps the most noteworthy American church of the day, unless it be the new Catholic Cathedral which is building in New York. Our readers are already familiar with its general aspect from the heliotype we published of it two numbers back; we hope in the course of time to give fuller illustrations of it. The front towers, it may be said, are not what the architects would have them, and hope some day to have them. The notable things in the treatment of the church are the novelty of the style, for this country, and indeed for any country in this age; the grand mass of the central tower, and the way in which the plan is adapted to the needs of a large congregation. In this last matter the disposition of the floor, entirely unencumbered by pillars, gathering the whole congregation within near reach of the officiating clergyman's voice; the unusual size of the chancel, which is sixty feet deep and fifty wide, the communion-table being encircled by the rail, to allow a large number to receive the communion at once; the broad galleries filling the transepts, — all these deserve special notice. The interior architectural treatment, too, is new here; the flat ceiling of the central tower is a hundred feet above the floor; the trefoiled wagon-arched ceiling has no fellow in the country. The church has very visible

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faults. The shortness of the nave is a mistake that must now be evident to the architects. It mars the proportion of the interior, and huddles the exterior together. The church greatly needs two more bays, which might have been added in the building at a trifling cost, and for which the ground gave room enough. The detail is various in style and quality, and seems to us to oscillate between conventionalism and naturalism: on the exterior much of it looks carelessly studied, and even rude, while much is rich and refined. The curtain walls of the central tower seem almost too much cut away into openings; which is due, we presume, to a desire to lessen the weight of the tower as much as possible. Covering the broad louvre-boards of the upper tower windows with the same tiles as the roof above gives the impression that the roof extends down inside to the bottom of these windows, which look like openings in a parapet. This, however, is a difficulty easily removed. For all these drawbacks, however, there is in the work a union of richness and breadth, a singular charm of color, and a noble dignity, that lift it above any thing that has been done in the country within our knowledge. We mean at another time to speak of the decoration of the church, which has been done in an extremely interesting manner under Mr. La Farge.

WE are glad to learn that the duty of providing for the proper reception and placing of the Bartholdi statue of Liberty has been taken in hand by persons of influence enough to assure its being properly performed. The committee, which was appointed by a meeting of New York gentlemen at the Century Club last month, and which includes among others, Mr. Bryant and Mr. Evarts, has issued an address to the people of the United States, inviting a general subscription in amounts of from ten cents to one hundred dollars, and asking the aid of chambers of commerce, boards of trade, clubs and societies, public or private, in furtherance of it. A sub-committee has already been formed in Boston, and a circular issued with request for subscriptions. A memorial addressed to the Government asking permission to occupy Bedloe Island with the statue has been referred to Congress by the President with his approval. The details of the project are well known: we have more than once noticed it (*American Architect*, Vol. I. pp. 137, 184, 329). Two hundred copies of the first model are to be made in terra-cotta, and sold at three hundred dollars each for the benefit of the undertaking, after which the model will be destroyed.

WE hope that there will be no longer any difficulty in raising with promptness the money which is needed for providing the pedestal and setting up the statue. It was a generous enterprise, as it certainly was a novel one, for the friends of the United States in France to provide so costly a birthday gift for our nation. It is the custom of the time to set little value on professions of international regard; but whatever justification this may have in diplomacy, it is sure that there is very real warmth in the good feeling of individuals that urges them to an undertaking of such difficulty and cost. The character and influence of the men who lead it (Laboulaye, Henri Martin, Lafayette, Rochambeau, Tocqueville, Rémusat, and others of note) make it a kindness which it is worth our while to acknowledge thankfully and gracefully, and to do our best to preserve, — to say nothing of the duty of courtesy, which seems as much in place between nations as individuals, notwithstanding our recent precedents to the contrary. There is not the smallest doubt that when once we receive the gift, we shall prize it highly. It will be becoming to acknowledge this in advance, and not to dull the good feeling of the friends who are preparing it for us. The artistic success of the scheme is a matter of experiment, like any novelty; but the ability of the sculptor who has undertaken it, the dignity of the conception, and the grand isolation of the chosen position, are a good guaranty of success. The committee, with an eye to the predilections of their countrymen, shrewdly remind them that the statue is to be one hundred feet high; to which it may be added that it will be twice as high as the famous sitting statue of Buddha in Japan, and nearly twice as high as the Bavaria at Munich. We do not remember the dimensions of the statue of Arminius in the Thuringian Forest, unveiled about a year ago.

IT is said that the Board of Engineers appointed by the Government to examine the condition of the Washington Monument have reported that it will not do to try to finish it. They have tested the soil on which it is built, and find it not solid enough to bear the weight of the intended structure. They are expected to recommend that the monument be taken down, and its material used in a new one to be built in the circle at the intersection of Massachusetts Avenue and Fourteenth Street, — a large and rather high open space in the northern part of the city, which would display a commanding structure to great advantage. We are very glad to believe that this report will settle the question of carrying out the present design, and are thankful for any cause that will prevent what promised to be an irredeemable blunder.

A TASK in engineering which has been before the world since the day of Julius Cæsar was completed not long ago in Italy. About fifty miles east of Rome, among the mountains of Abruzzi, and two thousand feet above the sea-level, lies, or lay, the Lake Fucino, famous for the efforts made to drain it by the Roman emperors and others of later times. The lake had no outlet, was broad and shallow, being thirty miles or more in circumference, and so was subject to excessive overflow, submerging its borders for miles about it, and making the cultivation and even the inhabiting of the surrounding plain very precarious. It was one of Cæsar's projects to drain it; but the thing was not seriously attempted till the reign of Claudius. He undertook, not to drain the lake, but to reduce it, and control its overflows, by tunnelling an outlet through the surrounding hills. He kept thirty thousand men at work for eleven years, it is said, till he had made a tunnel three miles and a half long, leading the water to the neighboring river Liris. The immense scale of the work made Pliny applaud it as the eighth wonder of the world; and when it was done the emperor celebrated it with a bloody *naumachia* or sea-fight of gladiators, which is as famous in history as the work it commemorates. Nevertheless by the time of Tacitus the tunnel had fallen into ruin, owing, as the historian says, to the bad construction of the contractor or superintendent, who grew rich by the work; and in spite of attempts by Trajan and Hadrian to restore it, gradually became choked, and was given up. The Emperor Frederick II. tried to re-open it in the thirteenth century, but failed.

PRINCE TORLONIA, to whom the final accomplishment of the great work within a year or so is due, has just published an account of it in a book. It is more than twenty-two years since he began it. The lake had risen some thirty feet since the latter half of the eighteenth century; and in 1852 a private corporation gained from the Bourbon Government a grant of the land in the bed of the lake, on condition that they succeeded in draining it. In 1854 Prince Torlonia purchased the rights of the company, and undertook the whole enterprise himself. He put it in charge of a noted Swiss engineer, M. de Montricher, who had constructed the water-works of the city of Marseilles. Montricher died half a dozen years after, and his next successor, M. Bermont, died in 1870, leaving the work to be finished under a third engineer, M. Brisse. The difficulties of the work, and the determination of the prince, made it a saying among the country people that "either Torlonia would drain Fucino, or Fucino would drain Torlonia;" but he has survived to see it finished, and to begin to reap his reward in the cultivation of the reclaimed lands. The tunnel has followed mainly the line of Claudius, but is deeper and of greater capacity than his. The Claudian excavations were found to be very irregular in section and construction, branching into numberless small galleries like rabbit-burrows, and reached by nearly forty square shafts lined, some with timbers, and some with the Roman masonry known as *opus reticulatum;* some of the shafts being three hundred feet deep, and the greater part of the whole work excavated in the solid rock. The length of the new tunnel is said to be 6,887 yards, and the fall from the lake to the river about 80 feet.

COVERS are now ready for our first volume. The publishers will bind old numbers for two dollars the volume, or will send, post-paid, a cover for binding for one dollar.

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THE PROPOSED ACT FOR THE SECURITY OF THEATRES IN NEW YORK.

DIRECTLY after the destruction of the Brooklyn Theatre, the New York Chapter of the American Institute of Architects, through its Examination Committee, took up the problem of preparing such amendments of the building-laws for the city as should enforce the substantial building of theatres, and insure as far as proper arrangement and sound construction could, aided by the right appliances for controlling fires, the safety of audiences. The Committee, after spending much time and labor on the subject, have prepared an act "to provide for stability of construction and security against conflagration, panic, or other accident in theatres hereafter to be erected in the city of New York," which, after being approved by the New York Chapter of the Institute and by the Board of Underwriters, was introduced some days ago into the State Senate by Mr. Gerard. We have received a copy of the bill, which has been thoroughly studied and carried out in its technical detail with admirable care. It embodies the main provisions which European experience has shown to be important, and which are enforced in the French and German laws for theatre-construction, with such special precautions as have been suggested by study of our experience at home, and notably by the Brooklyn disaster. As it stands, it contains substantially all the requirements that are agreed upon as most essential; though there are one or two points on which we should have been disposed to urge further precaution, and one or two matters of detail which we should not have pressed so far.

In regard to the situation of theatres, the act proposes a much-needed reform. This is a point that in well-administered foreign cities is carefully guarded, but in which in the United States the most necessary precaution is neglected. We sincerely trust that nothing will be done to modify here the stringency of the provisions of the act. Not only are theatres buildings in which extraordinary facilities for egress at various points are required for the safety of those who attend them, but they are dangerous neighbors; and since those whose buildings adjoin them cannot protect themselves against risk from them, it is reasonable that the law should do so as far as practicable. The act provides that every theatre, or building used as such, shall have at least one front on a public street, in which there shall be suitable means of entrance and exit for the audience. It orders that an open area shall be reserved on all sides of that part of the building which contains the auditorium and the stage. The area is not to be less than ten feet wide, — for theatres which hold more than one thousand people a greater width may be required by the superintendent of buildings, — it must have one or more outlets upon the street, and the outlets must not aggregate less than twenty feet in width. They are to be closed with gates swinging outward, kept open during the performances, and far enough recessed not to swing into the street. If any buildings are built over these outlets, they are to be of fire-proof construction throughout. This is of course intended to cover the case of the front of the building being used for shops or other not theatrical premises; and the act further orders that no portion of it shall be used for a hotel or lodging-house or factory workshop or storehouse. It also forbids — and this is in our minds a point of great importance — the use of the space above or beneath the auditorium for storage or for workshops. Scenery and decorations not actually in use are not to be kept in the theatre itself, but in a separate building; nor are the carpenters' shops and scene-painting rooms to be in the theatre; and finally, no lodgings are to be allowed in theatres, except for the janitors and ticket-sellers.

In regard to construction, the act provides that all exterior walls shall be of stone or brick; and that when the fronts are of iron, these shall be solidly backed with brick. A fire-wall of stone or brick must separate the stage from the auditorium, and must be carried up into a parapet coped with stone or terra-cotta, four feet above the roof. The interior walls also which separate the auditorium from the rest of the theatre, and those which enclose rooms, staircases, or corridors for the use of the audience, or the dressing-rooms for the actors, are to be of fire-proof material, as are all the staircases, and the floors of that part of the building which the audience uses. The roof must be incombustible and framed in iron; the ceiling of the auditorium, and all decorations and fixtures above or on the sides of the proscenium arch, must also be fire-proof. It is ordered that there shall be doorways in the proscenium wall, on both sides of the curtain-opening at every floor. These doorways must be accessible at all times from both the stage and auditorium, and must be provided with double wrought-iron doors. All the doors of the auditorium and of the dressing-rooms, or in any of the walls that are required to be fire-proof, must also be of wrought iron. We are not sure, by the way, that it is desirable to insist on so many iron doors. They are apt to be in the way, and more or less unmanageable. In places where they were much used, there would be little likelihood of their ever being shut, and a very good chance of their being forgotten or refusing to shut in an emergency. A later paragraph in the act, however, allows the substitution of double-battened doors of wood in two thicknesses, crossed diagonally; and these would probably be sufficient in most positions. For the openings in the proscenium wall, the iron doors would be absolutely necessary, but we are inclined to doubt the wisdom of providing these openings. They are intended, obviously, to furnish a way of escape between the stage and the auditorium, in case either takes fire: nevertheless we prefer the French way of forbidding such openings. In theatres which are properly isolated from the surrounding buildings, as is provided in the act, there is no difficulty in getting sufficient outlets from the stage and dressing-rooms; and for the audience, a direct exit in front of the proscenium wall is preferable to one through it. It seems to us, in fact, that exits at this point on both sides ought to be *de rigueur;* for in the first place, it is important not only that there should be many exits, but that they should be as wisely distributed as possible. And then it is to be remembered that though in a theatre the great point of danger is the stage, it is no more exempt than other buildings from the chances of fire in other parts of the house; especially when, as is likely to happen, shops or other premises in the front of the building are leased to outside persons. We think it also important that there should be stairs from top to bottom on each side the proscenium, against the stage wall; but these stairs are likely to be endangered and perhaps obstructed by putting doors in the wall beside them. An opening is desirable for the convenience of privileged spectators, who wish to pass from the auditorium, and especially from the stage boxes, to the stage; but for these openings in one story would be sufficient, if there were stairs at hand. The openings should be in the lower story, where they would bring the least danger; and it would be desirable to connect them with a corridor some ten or fifteen feet long, vaulted in brick, through which fire would not be likely to be communicated.

The question of the circulation and exit of the audience has been carefully considered in framing the act. An excellent provision is that on each floor or gallery, there shall be room outside the auditorium for all the spectators for whom places are furnished on that floor or gallery, allowing two hundred and fifty feet of area for every hundred persons. For three hundred persons in the theatre, there must be at least two exits; for five hundred, three; no door is to be less than five feet wide; and for every additional hundred persons beyond five hundred, an extra twenty inches of width is to be allowed in exit-room. Moreover, where there is more than one gallery, distinct places of exit are to be provided for each above the first, the spectators in the floor and first gallery being allowed the same exit.

At least two independent staircases are required for each gallery, and they must be on opposite sides; the same provision is required for the stage; and all these staircases must have their direct exterior outlets. Stairs which serve for the exit of fifty people must be at least four feet wide if they are straight, and if curved, five feet; and six inches in width must be added for every additional fifty persons. Stairs leading to the upper galleries are to be enclosed on both sides with brick walls; and all stairs and corridors are to be provided with hand-rails. Stairs that are more than eight feet wide must be divided by a rail down the middle. Wherever it is practicable, inclined planes, with a rise of not more than one in ten, are to be substituted for steps and stairs. In the auditorium, the aisles are ordered to have a width of twenty-two inches for every hundred persons who are to use them, and to be not less than three and a half feet wide in any case. They are to be increased in width toward the doors as

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the rate of an inch in every five running feet, when possible; and the doors to which they lead must be as wide as the aisles themselves. No seat is to be farther than the sixth from an aisle; therefore there can be no more than thirteen seats abreast between any two aisles.

The special precautions that are ordered against fire are, a curtain of wire netting; one or more steam-pumps, of power enough to throw water to all parts of the building; stand-pipes with fire-plugs and hose at each floor-level, on both sides of the stage; a reservoir over the proscenium, to supply the stand-pipes; and sprinklers over the stage and auditorium. The theatres must be heated by steam, and stoves are banished and boilers isolated. It is also ordered that a sufficient number of uniformed firemen, under control of the city fire department, be in attendance on each performance.

There are many details by which the chief provisions of the act are guarded and supplemented, into which we have not room to enter. There are one or two restrictions which we should have liked to see added. We should have been glad to have second-story auditoriums absolutely forbidden. The use of premises beneath a theatre is altogether too dangerous to be allowed, we think, and the difficulty of getting an audience safely out too much increased by lifting them all an additional story. We have already argued for requiring stairs against the proscenium wall, in discussing the question of doors in that wall. On the other hand, the requirement of steam-pumps seems to us of doubtful utility. The head of steam which would be wanted to warm the building would not run the pumps even if the same boilers could be trusted to do it, nor could steam very well be got up in time to be any security to the audience, and on warm nights there is no steam. To compel a separate fire to be kept in readiness during performances would seem to be rather an unreasonable exaction. We do not know how much head the New York water-pipes supply, perhaps not a great deal with their present scanty provision; but every city ought to have a high service supply for just such emergencies, and it strikes us as more reasonable to look to this, or, if need be, to require it of the city, than to insist on the difficult and perhaps treacherous precaution of steam-pumps in the theatres, which only a very rigid inspection would keep in working order.

We are very glad to see this work taken in hand with the care and serious purpose that the act shows; and we hope to learn in due time that the act is passed substantially as it stands. It will naturally meet with some opposition, but we hope it will not be materially abated at any point, for all its chief requirements are the dictates of a larger experience than that of our own cities. Our present habit of theatre-construction is intolerably poor and mean; reckless is not too strong a word for it. Any third-rate Continental city would be ashamed of it. There is no reason why Americans should lag contentedly behind the rest of the world as they do in building; but they will do so unless they are hastened by legislation. Natural selection will not cure the trouble, or will do it too slowly for our safety. It must be provided for by careful and decisive enactments.

ARCHITECTURAL ILLUSTRATIONS.—II.

PROCESSES.

[From a paper read by Mr. Maurice B. Adams before the R. I. B. A.]

TURNING from a retrospective view, let us inquire what processes are now available for the production of architectural illustrations. Wood-engraving as the oldest at once presents itself. The ease with which wood-blocks can be "set up" and printed with type will always give the process a preference with publishers; while for the purposes of diagram it will ever command a large amount of attention. The chief drawback of its application to the higher forms of architectural illustration is the difficulty of securing an engraver whose technical knowledge is sufficient to enable him to preserve those qualities so indispensable in an architectural drawing; and I think you will readily agree that most woodcuts of buildings now published are characterized by this want of technical feeling. Those in the works of Viollet-le-Duc are an exception; indeed, where old work is represented they are every thing that could be desired; but the work of the engraver is reduced to a minimum, as the design is shown mainly in outline, while the drawings are made on the wood by M. Viollet-le-Duc himself. And this should always be done when possible, either by the architect or some technical artist employed by him. Blocks already prepared can easily be obtained; and drawing on the wood is by no means a difficult task. To proceed, you take a little Bath brick dust, and a small quantity of Chinese white; place them upon the block, and with the finger moistened in water, spread a light coat of the white over the block's upper surface, which when dry is ready to be drawn upon. This is accomplished by photographing or tracing a reversed outline of the subject upon the block, and then lining it in with a very hard pencil, according to the nature of the work; and in some cases a silver point is used. A piece of paper must cover the work when finished, and used for the hand to rest upon while drawing. The paper is fixed to the block by rubbing the sides of the latter with beeswax.

Turning to plate-engraving, whether on steel or copper, we find that it is now little used in this country for architectural purposes, although still very generally employed on the Continent. This being the case, a description of the process will be unnecessary.

Lithography was invented in 1798. All kinds of lithography are based upon the principle of the attraction and repulsion of various antagonistic substances, such as water and oil. The drawing is made upon the stone or zinc plate with either chalk, crayon, or suitable ink, all being materials of a fatty nature. When the drawing is completed, the stone is sponged with water, which takes to the stone where not covered by the lines of the drawing: these repel the water on account of their greasy substance. After removing the surplus water, the drawing is "rolled in" by passing a roller charged with lithographic ink, which adheres to the lines because of their mutual affinity with it, while the pores of the stone's surface in other parts, being saturated with water, resist the adhesion of the ink. The stone is now ready for printing, which is accomplished by placing a piece of paper on the stone, and pulling it through the press. The advantage of zinc plates is their portability. They are only adapted for ink-work. When chalk is used, it is very difficult to keep the shading open; and the graining of the plate's surface is likely to give streaks of high light through the shaded parts. Where the weight and bulk of the stone is not an objection, it should always be employed in preference to zinc. To draw upon either, trace a reversed outline of the subject with red transfer-paper on to the surface. With the red outline thus obtained as a basis, the work may be inked in; and for architectural work ink is certainly the best. To make a satisfactory drawing upon the stone requires practice and skill, more perhaps than, generally speaking, architects would be able to give. Lithographic transfer-paper is more usually used for the reasons I have given. Transfer-papers are prepared with a coating on one surface of either gelatine, starch, or gum, the object of this coating being to interpose a soluble film between the drawing and the paper, else the latter would absorb the ink instead of permitting all of it to be transferred to the stone. In using the transfer-paper, draw on the glazed side; and in no case touch its surface with the hand, using a finger-paper to work upon. The sketch or drawing to be lithographed can be traced, as transfer-paper is made transparent for the purpose; but when mathematical instruments have to be employed, a thicker paper must be used. The paper in any case should be stretched. Unstretched paper is liable to be acted upon by the breath, causing the ink to run, and the paper to bulge from the surface of the object being traced. If the paper work greasily, dust it with whiting or chalk powder; and mistakes may be erased with ink-eraser or rubber. Should the correction required be a large one, paste a piece of fresh transfer paper over the part, and redraw the portion as required. Do not use gum. Perry's pens are softer, and work easier than Gillott's. The ink is mixed by warming a small saucer, and rubbing a stick of ink so as to cover the bottom thinly with it; then, with a drop of *distilled* water, rub with the finger until the ink is dissolved. For brush-work the ink is used darker than that employed for the pen. The transfer is best made by a practical lithographer, who does the printing.

Chromo-lithography need be described only by saying that a separate stone is required for each color, and a corresponding series of printings are necessary. This of course makes its application very expensive. A process called "stenochromy" has recently been invented, by which a large number of colors may be introduced into an impression by one printing. Several attempts had previously been made, chiefly by employing blocks of color put together like a child's puzzle; but the results in these cases gave the outline between the colors resembling what is known as Tonbridge ware. In the last process the inventor, Mr. Radde, melts his colors together in frame so that they blend, the one with the other, in his prints.

We now come to those processes founded upon photography, by which permanent impressions may be taken either in color or printer's ink; taking photo-lithography first as the most important for our purpose. It is based upon the well-known action of light in rendering gelatine and similar bodies under certain conditions insoluble; and this principle is the basis of the autotype, heliotype, and Woodbury processes. The first photo-lithograph published appeared in the *Building News* in 1868. In most cases the subjects are reduced in size, but in other respects are exact facsimiles. In making a drawing for reproduction by this process, the most important point to be observed is that there are no tones or half-tones in a photo-lithograph: every thing about it is dead black and white. The effect must be obtained entirely by the intermixture of white and black, as in a wood-engraving. The work must be firmly and evenly drawn, in clear lines, with a uni-

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formly black or brown shade of ink throughout. The best ink is Indian ink mixed with a little lampblack, to give a deadness of line. The paper should be as white as possible, with a hot-pressed surface. For pen-and-ink drawings there is nothing like common registration ink on account of the bluish tone which it gives; and a satisfactory lithograph may be obtained from it if used freely and evenly, and of not too blue a shade. Brown ink reproduces very well when the work is executed in lines only, and not having the shadows washed in, as it were, with a lot of lines run together, as is generally the case in drawings of this nature. For then, instead of having a transparent shadow, similar to the original, the photo-lithograph will give a dead black or brown smudge, according to the ink used in printing. Pencil and chalk drawings do not permit of satisfactory reproduction by this process.

The object of the process is to obtain a transfer in lithographic ink, which transfer can be laid down upon an ordinary stone or zinc plate, and printed from in the usual way. The paper used is prepared with a solution of bichromate of potash and gelatine. The negative, opaque in the whites, and transparent in the blacks, is placed in a frame for printing, with a piece of sensitized paper close to it. The light passing through the transparent parts acts upon the paper, rendering some parts insoluble in warm water: therefore, when the prepared paper is placed therein, those parts not affected will wash away. Before it is washed, the paper photograph is lightly coated with greasy ink, after which it is floated in warm water face uppermost, the soluble parts being removed. It is then placed upon a sheet of glass, and, when washed and dried, is ready to be transferred to the stone.

The remaining processes are all more or less similar to each other. The heliotype is analogous to photo-lithography, but is more comprehensive, and admits of gradations of light and tone, so that photographs from water-color drawings or nature can be printed. The printing in this case is from hardened films of gelatine mixed with chrome alum, resembling horn. I have shown several specimens, and of the phototint, which is an improved form of heliography. The autotype is similar to the last, several inks being used for one impression, great skill being required in printing, which makes the process expensive. The Woodbury process up to a certain point agrees with those already referred to; beyond that it is totally unlike either. Instead of printing from the gelatine films, they are forced by hydraulic pressure into plates composed of lead and type-metal, from which the impressions are then printed in gelatine ink or color. The results obtained by the process are delicate and clear, resembling a photograph in every point excepting perhaps the fugitive nature of the silver print — the Woodbury type prints being as permanent as printer's ink can make them. The cost of the impressions is rather more than those from the other kindred processes; and, like photographs, they require mounting, which of course not only adds to their expense, but their bulk for binding purposes. I have only to add that Mr. Woodbury is said to be continuing his experiments, with the idea of printing photographs in permanent colors, by combining his own process with the "stenochromatic," to which I have already alluded.

For a few copies of working-drawings, the aniline process of photographic printing is both suitable and economical, and can be recommended. It is only suited for the reproduction of boldly drawn *black ink* tracings.

Photography itself, of course, is an exceedingly important medium for the illustrations of architecture, not only for its own immediate productions, which for truthfulness and beauty must ever remain unsurpassed, but as a corrective against error in sketching, keeping the draughtsman up to the mark. Photography will never supersede sketching; indeed, it is not always possible to take interiors and details. Magnesium wire is sometimes used for this purpose; for instance, Mr. Parker obtained photographs of the Roman Catacombs in this manner. We have now touched upon all the more important processes applicable to the subject before us. All have their advantages as well as their objections. In my opinion none are so suitable, all things considered, as photo-lithography.

THE ILLUSTRATIONS.

SIDEBOARD DESIGNED BY MESSRS. MORLOCK AND BAYER.

(102 Dorrance Street, Providence.)

THE lower central section is arranged for one shelf covered with a cloth, with fringe and border hanging over front edge. On the right-hand side cupboard-door is carved a bird, the German name of which is *Auerhahn* (*Tetrao Urogallus*); on the left, a *Berghahn* (*Tetrao Tetrix*), — both treated conventionally, and to be carved out of the solid wood in high relief. These birds are known, but seldom seen, throughout Germany, Switzerland, and as far north as Siberia. In the upper central section is an arched mirror. On each side are cupboards. The foliage on the doors is to be carved out of the solid wood in low relief.

SIDEBOARD. MESSRS. FERRY AND GARDNER, ARCHITECTS.

(22½ Barnes Block, Springfield, Mass.)

M. E. CHURCH, FARMINGTON, ME. MESSRS. STARBUCK AND VINAL, ARCHITECTS.

(No. 639 Washington Street, Boston, Mass.)

This church, which is now building, is meant to accommodate five hundred persons in the auditorium, and one hundred in the gallery. The finish is of ash in the principal rooms; and the pews, which are laid in circular form, are of the same material. The interior truss finish is of pine, and with the walls will be painted. The windows are to be filled with rolled cathedral glass.

HOUSE AT MEDFORD, MASS. MESSRS. PEABODY AND STEARNS, ARCHITECTS.

(60 Devonshire Street, Boston, Mass.)

UNITED STATES COURT-HOUSE AND POST-OFFICE, MEMPHIS, TENN. MR. JAS. G. HILL, SUPERVISING ARCHITECT OF THE TREASURY DEPARTMENT.

The cost of this building is limited by act of Congress to $400,000, of which amount $101,000 were appropriated in July, 1876.

AMERICAN INSTITUTE OF ARCHITECTS.

BOSTON CHAPTER.

THE regular monthly meeting of the Boston Society of Architects was held on the 2d inst., at the Institute of Technology, the President in the chair.

The Secretary read the minutes of the last meeting, also various communications received during the month from the Secretary of the American Institute; from the Boston Society of Civil Engineers, concerning the metric system; from Mr. S. J. F. Thayer, asking that a doubtful question in professional practice might be discussed by the Society; and from Mr. Frank Darling of Toronto, asking for copies of documents to aid in the formation of an architectural association at that place.

The Society then proceeded to examine the pieces of frieze sent in in response to its invitation, and to award the prize offered for the best design. Thirteen friezes had been received, and two more have been sent in since the meeting, which had to be treated as *hors de concours*. After a careful examination the prize of fifty dollars was awarded to Mr. John Evans of Boston. The design of Mr. Lyons was selected for honorable mention as next in order of merit. (The friezes have all, including those received after the meeting, been placed on exhibition in the Roman room of the Museum of Fine Arts.)

A number of samples of enamelled bricks were received from the manufacturers, the Brick Enamelling Company of Philadelphia.

The Secretary remarked that it had been brought to his notice, that in the copies of the Constitution and By-Laws of this Society recently printed and distributed, certain amendments adopted some years before and never printed with the By-Laws had been inadvertently omitted. He asked for authority to cause a printed slip to be inserted in the remaining copies, which was granted.

The subject announced for discussion was then taken up, namely the present revival in England of the style of architecture commonly known as the Queen Anne style.

Mr. Van Brunt opened the discussion by remarking that the Queen Anne style has been improperly named. Its peculiarities were developed chiefly under the Stuarts, and had run into extravagance and decline before the time of Anne. After the Gothic of the middle ages had perished, a succession of mixed styles came into vogue one after another. The architecture of the Tudors was essentially mediæval with a tinge of classic; but the classic feeling gradually gained ground until under the Stuarts the style was essentially classic, but pervaded with much of the freedom of the mediæval. Later still, under Queen Anne the classic had conquered the whole field, and became entirely formal. The state of things at present prevailing in England is remarkable: after having become to all intents and purposes the national and generally accepted style, the Gothic is now abandoned by a considerable number of the younger architects, who are doing their best to revive the style known as the Queen Anne style. We are living in what may be called an epoch. We know every style as well as the generations did in which they were first known and practised. But our general knowledge prevents us from having strong convictions. The Gothic revival of the present century had a literary origin in the works of Pugin and Ruskin. The present movement has no such cause. What then is its motive? Is it in a returning love of symmetry and order? A conspicuous instance of the adoption of the style in a continuous series of buildings is seen in the buildings lately built by Mr. Robeson for the London School Board. The recent competitions at Oxford also furnish a notable instance. The style certainly seems to have elements which make it peculiarly adapted to modern uses.

Mr. Cabot thought the question as to the desirability of this revival should be determined by the test of practicableness. Judged by this test he would be inclined to say that it could not be regarded as an advance over the Gothic till now so universally practised. The stepped gables, for instance, present in a climate like our own certain obvious objections; and most of the external

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peculiarities of the Queen Anne style are open to the suspicion of a certain straining after picturesqueness, at the expense of good sense and good construction.

Mr. Van Brunt thought the stepped gable an allowable play of fancy, regarding it as simply the development of the sky-line of the gable, which in the more rigid Gothic is apt to be somewhat hard and uninteresting.

The secretary thought Mr. Van Brunt attached too much importance to the present movement in England. He thought it had not yet reached the dignity of a revival, and was only to be regarded as a fashion of the day, based on personal preference and personal taste, and having no root in reason or practical or artistic value. He would concede a certain picturesque charm to the old buildings of this style, but it was a charm largely due to age and decay, and was more especially felt in the country mansions where the architecture was helped out by the natural surroundings of trees and turf and gardens, etc. It is a style which requires of the architect of to-day the sacrifice of many modern notions which have come to be regarded as indispensable, such as large sheets of plate glass, double hung sash, narrow house-lots in cities, etc.

Mr. Van Brunt said the interior features of the style are extremely interesting, and quite adapted to modern uses, — the attenuated orders, the small projections, and general delicacy of design. The staircases are especially admirable.

Mr. Cabot agreed to this, and observed that many of the old mansions of New England had a good deal of this character in their interior finish. He has sometimes taken portions of such finish from old houses and set it up in new ones without substantial change. In using a style like this it is very necessary to exercise a careful discrimination, and to use only what is good in it, rejecting what is objectionable.

Mr. Clough said he had tried in recent school buildings for the city, to adapt the style to modern requirements, but had found the result to be not altogether satisfactory, and certainly not tending towards economy.

The Secretary condemned the puerility and feebleness of ornamentation which characterizes this style, — the wriggling gables, the little pyramids and balls and scrolls stuck about on every shelf and corner, — as unworthy of serious imitation; and contrasted all this nonsense with the grace and dignity and real picturesqueness of the style which prevailed at about the same time in France.

After some further discussion the meeting adjourned at about ten o'clock.

CORRESPONDENCE.

THE CONSTRUCTION OF MEMORIAL HALL. — THE PERMANENT EXHIBITION. — GRACE MEMORIAL CHURCH. — THE BELLS OF ST. MARK'S CHURCH.

PHILADELPHIA.

THE steamship "Pennsylvania," which sailed on the 1st inst. from this port for Liverpool, took out among her passengers Mr. Clement M. Biddle, the president of the Permanent Exhibition Company, and with him as consulting architect, Mr. Schwartzmann. They are to visit the permanent exhibitions of Europe, and, on their return, report upon the management and arrangements of them about the first of May. Mr. Schwartzmann was formerly landscape-gardener of the Fairmount Park, and later has become known as the architect of several buildings within the enclosure of the Centennial Exhibition, the principal of which is Memorial Hall, a building which almost from the very outset has been among educated people regarded as so far from being a success, that it is beginning to be very generally regretted that such a work should stand any chance of going down to posterity as representive of the architecture of the period. It was well known that the construction was very faulty; and the fact that the ornament, where not meagre, is meretricious, has been appreciated even more since the Exhibition than it was before. The large and highly decorated consoles in the rotunda, which appear to support the dome, are nothing less than hollow plaster affairs, which are hung indirectly to the iron dome by wires; while the construction of the dome itself seems to need all its strength to support the weight of the superfluous material which has been so needlessly used in the framing. As to the decorations of the exterior, the carvings over and around the entrance, the spread-eagles of stamped zinc painted and sanded to match the granite, with their wings supported with a tie-rod, — this is all beneath criticism ; and it is hardly too much to say that Mr. Petit's frank, honest, and masterly construction, open and apparent to every one, in the Main Building and Machinery Hall, seem even with their transient character to be far more representative work than what is beginning to be regarded as rather an absurd sort of elephant on the hands of — well, probably the State as much as any one may be considered the owner. However, it is generally understood to be in the hands of a commission ; and what is to be done with it remains to be seen. This winter it has been proven that it is extremely difficult to heat. The Pennsylvania Museum and School of Industrial Art seems to consider that it has the prior right and title to its occupancy ; but how that occupancy is to be rendered in any way successful or useful, also remains to be seen. The time may come, sooner perhaps than we realize, when the city will be quite as thickly built up and inhabited all around the Fairmount Park as it is around Independence Square ; and this location may then be found sufficiently central for the purposes of an art-educational headquarters ; but near as that may be, — judging by the increase and extension of the city within the past half-century, — it is yet too far in the future to blind practical people to the awkwardness, to say the least of it, of the locality for such a purpose at present. The old Quaker prejudices of Philadelphia die hard. There is no lack of liberality towards public institutions and educational movements ; but when it comes to any thing in the nature of local art, it is very often quietly smothered.

The average Philadelphian takes no pride in an art object being *par excellence* a local production. He is proud of the extent of the manufactures of the city, and of their mechanical excellence, but never for a moment seems to associate with them any ideal thought. For plain, substantial, commonplace things, home-manufactured articles satisfy us ; but when we begin to look up any thing of an artistic or decorative nature, we must go to New York, Boston, or London or Paris. Indeed, it is saddening to notice how much of this feeling may be observed in our best shops, where goods of local make have to be misrepresented as otherwise in order to secure sale. This is one of the most serious matters which must be overcome before the new School of Industrial Art will be able to make headway in the community ; and some very plain and embarrassing facts must be widely published ere the real value of such an institution begins to be realized in this city.

The managers of the International Exhibition, as the Permanent Exhibition Company seems to be known, are advancing bravely towards its opening, which it is expected will take place about the middle of May. It has issued an official bulletin, in pamphlet form, giving a sketch of the plan and objects of the enterprise, and much valuable information for exhibitors. A large open space in the centre of the building will be partitioned off, allowing accommodation for eight thousand people. Seats will be arranged in tiers from the floor to the organ-gallery (where the Roosevelt organ remains), for the accommodation of orchestras and choruses. South of this will be the art-gallery. The portion lately occupied by the South American republics, China, and Japan, will be allotted to the machinery. Some minor exhibits of a miscellaneous character are to go in the portion where Italy, the Scandinavian countries, and the English provinces exhibited ; and the whole eastern portion, that during the Centennial was almost exclusively American, will be assigned to the industrial exhibit.

The past month of January shows the smallest number of building-permits ever issued for any one month, being only forty-five.

A handsome little church, with sittings for about two hundred and fifty, has just been completed at Darlington, Md., by Mr. Chandler ; it will be known as Grace Memorial Church. The plan consists of a nave of five bays, chancel with small sacristy on south side, south porch, and, balancing it on the north, a semi-octagonal baptistery. The material of the walls is a delicate gray local soapstone, finished alike inside and out, affording a much more pleasing effect than the cold tint of marble, — in fact, a tender gray, more like that which time alone seems to have given to the old cathedrals of Northern Europe. The second bay on the south side is run up into a gable, to afford room for a very fine memorial window from the establishment of Charles Booth. The glass-work throughout is set immediately into the stone jambs of the windows, doing away entirely with the usual wooden frames.

Mr. Chandler has also just completed a very fine large residence at the south-west corner of Nineteenth and Spring Garden Streets, for Mr. W. S. Reyburn. The style is a species of Venetian classic, the material Connecticut brown stone. The door and windows have semicircular heads with pointed hoods, and the dormer-windows have stone canopies with boldly carved finials; the capitals of the imposts and the arch-heads display some excellent carving by Alex. Kemp. The Spring Garden street front has a central main entrance, on one side of which is a bay-window of two stories, running up to the cornice level ; and on the Nineteenth-street side are two bay-windows, — one of two stories, besides taking in a portion of the basement, which, by reason of the ground falling off, gives very eligible rooms; and the other corbelled out at the second-floor level. The whole building has a solid and substantial appearance without looking in any way heavy in mass or clumsy in detail. In the rear is a handsome stable in two stories, of red pressed brick, with brown-stone wrought work; on the second floor of this is a commodious billiard-room. The decorations and hangings of the house interior are by Herter of New York.

On the 3d inst. came up in the court of common pleas the case known as "George L. Harrison, *et al.*, *vs.* the Rector, Church-wardens, and Vestrymen of St. Mark's Church." The centre of the court was occupied by a model at about an eighth of an inch to a foot. of the church and houses occupying the two blocks extending from Walnut to Spruce Streets and from Sixteenth to Seventeenth Streets. The case is being argued before judges only, it not being a jury trial. The grounds of complaint are that four bells have lately been hung in the tower of this church, and have given great and varied annoyance to the occupants of the houses in the neighborhood. The defence shows that the bells are much lighter than those of other chimes in the city and neighborhood :

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that they are hung sixty-seven feet above the level of the curb-stone; they are also stated to be twenty feet higher than the bells of St. Stephen's in Tenth above Chestnut Street, and twenty-five feet higher than those of St. Patrick's, a church within about three squares of that in question, and that they are rung only at the usual hours for service. In the final decision of the court, which may be rendered shortly, it can hardly be doubted that the bell-founders will be quite as much interested as any class in the community.

THE "COMPETITION" TRACT.

THE Committee of the American Institute of Architects has again called attention to this subject, and invited critical correspondence. In so doing they seem to ignore the fact that there is a respectable minority of the profession, whose views have already been given them, who are opposed to competitions altogether, and who believe it the duty of the Institute to throw its influence strongly in this direction. If an evil cannot be abolished, then is the time to regulate it. It is painfully evident as time goes on, that the reform efforts of this so-considered representative society are timid and feeble.

The opponent of competitions in this country finds able backers among his English brethren, notably in a former president of the London Architectural Association, and in Mr. Charles Barry; the latter of whom, in his inaugural address, styles the "present system of architectural competition" as "hateful."

That competition leads to a great amount of hard feeling among architects, is plain enough. That it has precedent or parallel in similar callings, cannot be shown. Every attempt to regulate it has proved simply farcical. The efforts of its advocates have sapped the dignity of the profession and reduced rates of compensation; and their practices have been especially injurious to the very class it is loudly proclaimed are to benefit by the system, — the younger men. They are met at every turn by the statement that men who they know ought to know better, and can afford to do better, will do work for half price and furnish sketches gratis, on the chance of employment. This beggar's attitude — sketch in one hand and hat in the other — in which we are constantly presented, is the cause of half the bad treatment received, and is only made worse by complaints of want of appreciation by the public.

Most of the evils which seriously and permanently affect the standing of the profession are the fault of architects themselves; and the sooner the fact is recognized, the better. If the impression is persistently cultivated that "show drawing," or in fact any drawing as such, is the principal part of service, and that drawings may be had for the asking, is it strange that people will not value our work above our own price?

But the worst results come from the reaction on the profession itself. The present practice poisons the sources of education, and encourages the crowding of the lower ranks with half-taught youth who are led to hope that by some lucky bit of art gambling, backed by clever tricks of draughtsmanship, the highest professional position may be attained in a day. This effect is nicely described it the "Tract" as "Opening a Chance of discovering Unknown Talent." It may be that the substrata of American society are full of architectural genius, which it is the business of the Institute to drag to the surface; but the popular belief that real talent cannot be long hid stands the test of time better. The building of to-day would be sensibly improved if a greater interval of time, and consequent amount of professional drudgery, intervened between the teaching of the schools and the responsibilities which come with the charge of important works.

In the face of these and other reasons, why should the majority of the profession and the Institute be dragooned into practices against their highest interests? The necessity of the system is a myth and a bugaboo. It cannot be shown in tangible and reasonable form. It only needs a little vigorous treatment to consign it to its proper position among the blunders and follies of the past.

J. A. F.

THE DRAINAGE OF COUNTRY HOUSES.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — Mr. James C. Bayles, in a communication printed in your issue of Feb. 3, condemns the plan of underground irrigation as a means for disposing of household wastes. Having found this plan amply indorsed by the best sanitary authorities of England, and having used it, as I believe with complete success, for six years, I have ventured to recommend it as being by far the best system available in nearly all cases where there is no public sewerage.

Mr. Bayles's criticism has not had the effect of convincing me that I have been wrong in my judgment. He attaches more exclusive importance to the action of vegetation than I do, and he overlooks the oxidation of organic matter among the pores of an aërated soil, which is the great disinfecting action that the system secures. His modifications of the plan include the radical mistake of placing the pipes eighteen inches below the surface of the ground. I have adopted twelve inches as being the extreme admissible limit. Six inches would be much better, were it not that in our climate it gives too little protection against frost. The nearer to the surface, that is, the nearer to the air, — and incidentally the nearer to the roots of plants, — the better. Where frost is not to be feared, a depth of six inches should be adopted. Long and careful observation of the working of my own pipes has developed but one serious defect. The drains are under the lawn, which is conspicuous from the house and from the street; and it has been impossible to secure a fine covering over them, the soil along the lines being taken up by coarse, rank grass, which marks them distinctly.

I believe that even in Mr. Bayles's ground, although the atmospheric action at such a depth is very much less, no particle of organic matter is ever carried down to any considerable depth below his drains. The amount of liquid is small, and it is widely diffused. If delivered by a flush-tank in considerable volumes, it will saturate the ground near the pipes, and drive out whatever air its interstices may contain. As the liquid settles away, air will take its place ; and furthermore, what does settle away will be in the condition of pure water, having left its impurities in the filter through which it has passed. Before his flush-tank delivers a second volume, these impurities will have gone far on their road to destruction.

At Merthyr Tydvil, in Wales, the whole sewage of a large town having an abundant water-supply is disposed of by what Mr. Bailey Denton calls "Intermittent Downward Filtration," through a light, loamy soil, underlaid by a very open, light, gravelly subsoil, which has its outlet through under-drains six feet deep. The area of this filter-bed gives about *twenty-two square feet* for each member of the population. The process has been entirely effective in purifying the sewage to the condition of "fair, potable water," although its original condition is so bad that the town had been prohibited by injunction from continuing to discharge it directly into the River Taff. The effluent water, as analyzed by Dr. Frankland, was found to contain in 100,000 parts only 0.688 of organic matter.

From a notice of the annual report of Dr. Dyke, medical officer of health of Merthyr Tydvil, in the *Sanitary Review* of Oct. 30, 1875, I quote: "As part of his duty he has 'from time to time examined the water flowing out, and satisfied himself that there has been no perceptible increase in the amount of organic matter dissolved therein.' For in July, 1872, it was proved by the investigation made by Dr. Frankland to contain only one part of organic matter in 200,000 parts of water; and in 1874 it was found just as free from impurity, showing that no saturation of the soil went on, the growth of vegetables on the surface, and the aëration effected by drainage, doing the work of purification effectually."

My suggestion is to use this system, usually where there is no public water-supply, with an area of 2,500 square feet for each household. If there are ten persons in the family there will be an area of 250 square feet for each. The character of the soil will have much to do with the *process* of purification, but probably not much with its *efficiency;* heavy clay soils exert in themselves a stronger absorptive action than do porous soils, but porous soils are much more open to the admission of air with its destructive oxygen.

Naturally, the system will work best when the ground is not frozen at all; and during the season of vegetation we have the further advantage, — which I believe to be only a secondary one, — that the products of decomposition are taken up by the roots of plants. If not so taken up, they would be entirely dissipated. Let us suppose that a household of ten persons uses 300 gallons of water per day. This will give three gallons of sewage to twenty-five square feet of ground. If there is no gravel streak to lead the descending water of heavy rains to the well, until we reach a depth of only six feet, we shall have 150 cubic feet of earth to filter three gallons of water per day. S. W. Johnson, in confirmation of his statements as to the absorptive power of soils, quotes as follows from Bronner:[1] "Fill a bottle which has a small hole in its bottom with fine river-sand or half-dry sifted garden earth. Pour gradually into the bottle thick and putrefied dung-liquor until its contents are saturated. The liquid that flows out at the lower opening appears almost odorless and colorless, and has entirely lost its original properties. . . . These examples sufficiently prove that the soil, even sand, possesses the property of attracting and fully absorbing the extractive matters, *so that the water which subsequently passes is not able to remove them; even the soluble salts are absorbed, and are only washed out to a small extent by new quantities of water.*"

All who have had occasion to study the action of earth upon manure well understand the fundamental agricultural principle that organic matter once seized upon by the soil is never again given up in its unchanged condition; and if any thing is certain in connection with the chemistry of the subject, it is that Mr. Bayles is mistaken when he says, "In a light porous soil, there is nothing to hinder the accumulations of six or seven months of each year from working down until the soil is saturated and our own or our neighbor's well polluted." There is unceasing oxidation to prevent any accumulation, and there is the unyielding grip of the interior surfaces of the soil to prevent added organic matters from working downward.

[1] How Crops Feed, p. 333.

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It seems to me that Mr. Bayles has made the mistake of supposing that some such action is possible when sewage matters are discharged into the upper soil, as takes place when they leach away from an open cesspool through the fissures of rock in the case which he so well describes, or when they are discharged directly into a water-bearing stratum of the soil, or even when the discharge is always concentrated at the same point, as at the end of a kitchen drain. Probably no corresponding action would occur at a depth of several times eighteen inches below the surface, — though the deeper, the less the aëration and oxidation. That nothing comparable to it is possible with the system that I have recommended, seems very clear.

I have gone thus fully into the subject because it has interested me so intimately for years, and because my recommendation of sub-irrigation was not made unadvisedly. My faith is so strong that I am glad to have had this opportunity to give its justifying reason.

It is hardly worth while after my recent reply on the subject (Dec. 23, 1876) to Mr. Towne's communication, to do more than to reiterate the opinion there expressed of the tight cesspool, — that it is "sure to be, at best, only a mitigated nuisance, ready to become a source of real danger whenever its impervious wall is accidentally made pervious, or when its ventilation fails from any cause, or when its proper emptying is neglected, or when a sudden storm causes it to overflow or to set back into the house-drain."

I think that the tight cesspool is rarely to be recommended, occasionally to be permitted, and always to be suspected.

GEO. E. WARING, JUN.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — I have noted with much interest the letters from Col. Waring and Mr. James C. Bayles, which you have published in reply to my communication which appeared in your issue of 13th ult.

Permit me to recall the fact, however (which has, I think, been forgotten), that the question I proposed for consideration was, "How, *at reasonable cost*, can we secure the best result in disposing of sewage on level grounds?" and that I have in no sense undertaken to champion the use of leaching cesspools, but only to indicate how they could be used with the least danger in places where other systems, chiefly on account of cost, were excluded.

I may say further, that in addressing my first inquiry to you, I was impelled by a keen appreciation of the grave dangers involved in the use of the almost universal leaching cesspool, and by the hope that a discussion of the subject through your columns might lead to the publication of plans for dispensing with it, or at least lessening its power of harm.

Col. Waring, in your number of Jan. 27, reiterates his faith in the universal applicability of the Moule system of subsoil irrigation; but, in my opinion, still overlooks serious obstacles to its general use. In rebuttal of his views, Mr. Bayles, in your number of 3d inst., speaking from his personal experience, — his opinion, let me add, deriving additional weight from the good judgment and large experience of the giver, — makes objection that, in the climate of our Northern States, the system is practically inoperative during more than half the year, and is then open to the same objections as a leaching cesspool. Besides this objection others suggest themselves. Many of our houses have "basement kitchens," from which the soil-pipe necessarily passes at a point too low to admit of the Moule system on level ground; and, what in many cases I conceive to be the greatest objection of all, the area covered by the subsoil irrigation pipes is, on a small place, as likely as not to become the *children's play-ground;* unless, indeed, the already small limits of the latter be curtailed, and the appearance of the whole place injured, by railing off, as a sort of potter's field, the tract devoted to the reception of the household sewage.

Mr. Bayles in his letter urges the use of a tight cesspool, five feet in diameter and six feet deep, to be emptied whenever filled; but where there is an ample water-supply, such a cesspool would require attention every day or two. A cistern of the size named contains only some nine hundred gallons; and this amount of liquid will be discharged from a house containing (say) eight inhabitants, in about three days, under ordinary conditions. (The water consumption of London averages twenty-eight gallons *per diem* to each inhabitant; in Glasgow the same average is about fifty gallons.)

To dispose of this amount of liquid matter by carting it away would be very costly (it would weigh over three tons — one ton *per diem*); while to discharge by pumping this amount of sewage, greatly diluted though it be, upon the surface of even a large house-lot would, in my judgment, be very objectionable; to say nothing of the labor of pumping. In summer the plan would be least objectionable, if carefully managed, although of doubtful safety where the grounds are much used for pleasure, particularly by children; but in winter, when the purifying action of vegetation is *nil*, and all soakage cut off so that the tainted water either forms pools upon the surface, or, if frozen, does so ultimately when it melts, the system, it seems to me, becomes inadmissible.

Indeed, turn which way we may, the problem is beset with difficulties; and yet it is one of the utmost importance in every town not provided with a system of sewers. The wealthy householder can by liberal expenditure make his own arrangements safe, but he cannot protect himself from danger arising from the ignorance or indifference of his neighbors. The person of limited means, whether householder or tenant, may perhaps understand the importance of these matters (although how few, even of the best-educated classes, as yet realize their vital importance to every community!), but too often lacks the means to effect the necessary reforms or the knowledge as to what should be done. It was in the hope of eliciting information as to how, *at moderate expenditure*, comparative safety could be attained, particularly on level grounds, that this discussion was commenced. If it is abandoned at this point I fear we must regard it as a failure. I trust, however, that the discussion is not ended.

Mr. Bayles in his closing sentence touches on the most serious aspect of the present faulty systems, — the danger for the future; and we cannot too soon realize the importance of terminating the pollution of the earth around, and even under the very houses in which we live, which is now so extensively and so recklessly proceeding in every town not provided with a sewerage system.

In dealing with physical problems it is often useful to have them clearly stated and the issue well defined. The present case admits of such treatment, and may be stated thus: Of the sewage of an ordinary house, where there is an abundant water-supply, much less than five per cent consists of organic impurities and solid matter, all the rest being water. Now the question is, How can we separate these constituents, collecting the solids in a proper receptacle, and permitting the water, deprived of all impurities, to escape into the soil? Where cost is not considered this can undoubtedly be done by the use of settling tanks, filters, and constant attention. Can the same end be approximately obtained at moderate cost, and if so, how? Such a plan would avoid the objections I have pointed out in each of the systems advocated by Messrs. Waring and Bayles respectively. Is it attainable?

Yours respectfully, HENRY R. TOWNE.

STAMFORD, CONN., Feb. 9, 1877.

NOTES AND CLIPPINGS.

SCHOOLHOUSES FOR JAPAN. — The City Architect of Boston has completed plans of the Frothingham Grammar Schoolhouse, and the primary building at the corner of Roxbury and King Streets, to be sent to Japan. The Japanese Commission selected these as the model schoolhouses of all they saw in this country and Europe; and when in Boston purchased $10,000 worth of supplies, — books, school furniture, etc., — to be transported to their native country, and used to furnish buildings constructed after these models.

A CONCRETE WALL. — The United States Government has built a concrete wall at Minneapolis, Minn., for the protection of St. Anthony's Falls The wall, which cost $900,000, is 1,875 feet long, forty feet high, and seven feet wide at the base, diminishing to four feet at the top.

GAS-STOVES. — A warning against the ignorant use of the gas-stove is furnished by two deaths which have lately been caused by this seemingly safe and certainly convenient heating-apparatus. In each instance death was caused by the presence of carbonic oxide, — a gas which was produced by the imperfect combustion of the illuminating gas.

STATUES FOR THE HÔTEL DE VILLE, PARIS. — Twenty-two of the statues of the old Hôtel de Ville, in Paris, have been restored, and will be placed on the new edifice. They include those of Buffon, De Sully, Mansard, Debrun, Voltaire, and Vincent de Paul. Fourteen which were too much injured for restoration will be replaced by new.

THEATRE EMPLOYEES. — Of the 603 employees on duty at the Opera House in Paris during a ball or *bal masque*, 45 are managers and attendants, 72 are machinists, 18 are lamplighters, 42 are firemen, 4 are officers, 40 men are on guard inside the building, and 60 on the outside, making a corps of 281 men whose chief duty is to assure the safety of the visitors.

LA COLONNE VENDÔME. — The cost of rebuilding and repairing the column of the Place Vendôme in Paris, which was thrown down by the communists during the commune, is reported to be $64,718. The painter Courbet, who was instrumental in causing the overthrow, is made responsible for the money as far as his property, which is considerable, will allow.

UNDERGROUND RAILWAYS. — Not long ago the municipality of Paris sent a deputation to London to examine the underground railway. It has now been decided to build similar railways under Paris at a cost of 160,000,000 francs. The Seine will be crossed by two tunnels, one for the up line, one for the down, each enclosed in brickwork, surrounded by tubes of plate iron measuring over 18 feet in diameter.

ST. GERMAIN L'AUXERROIS. — The south side of St. Germain L'Auxerrois, Paris, which was built in the twelfth century, is to be restored at a cost of some $30,000. From this church was taken the body of the murdered Maréchal d'Ancre, which was dragged to the Place de Gréve, where its heart was cooked and eaten by one of the mob.

THE MOODY TABERNACLE AT BOSTON. — The Inspector of Buildings emphatically denies the report that the Tabernacle is unsafe.

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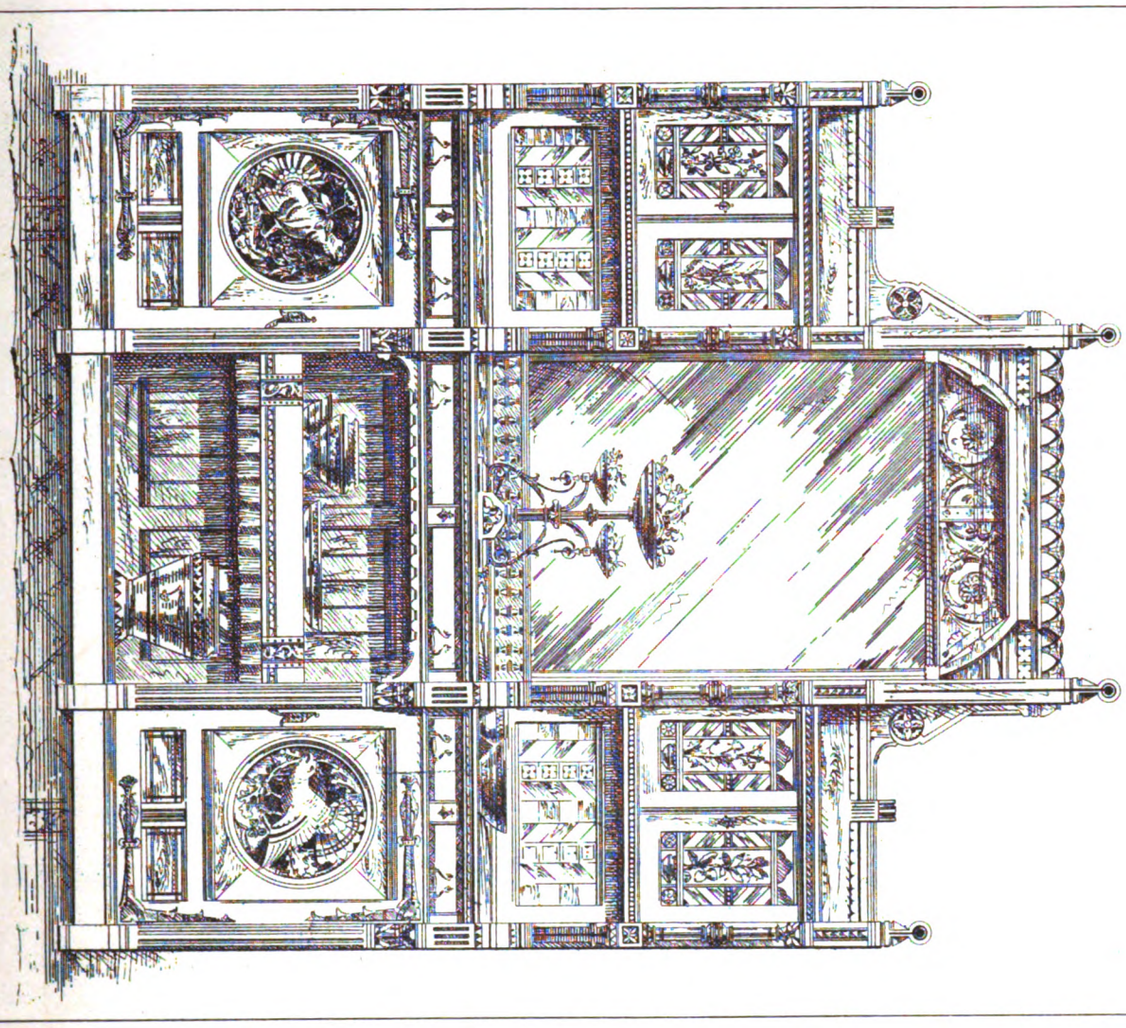

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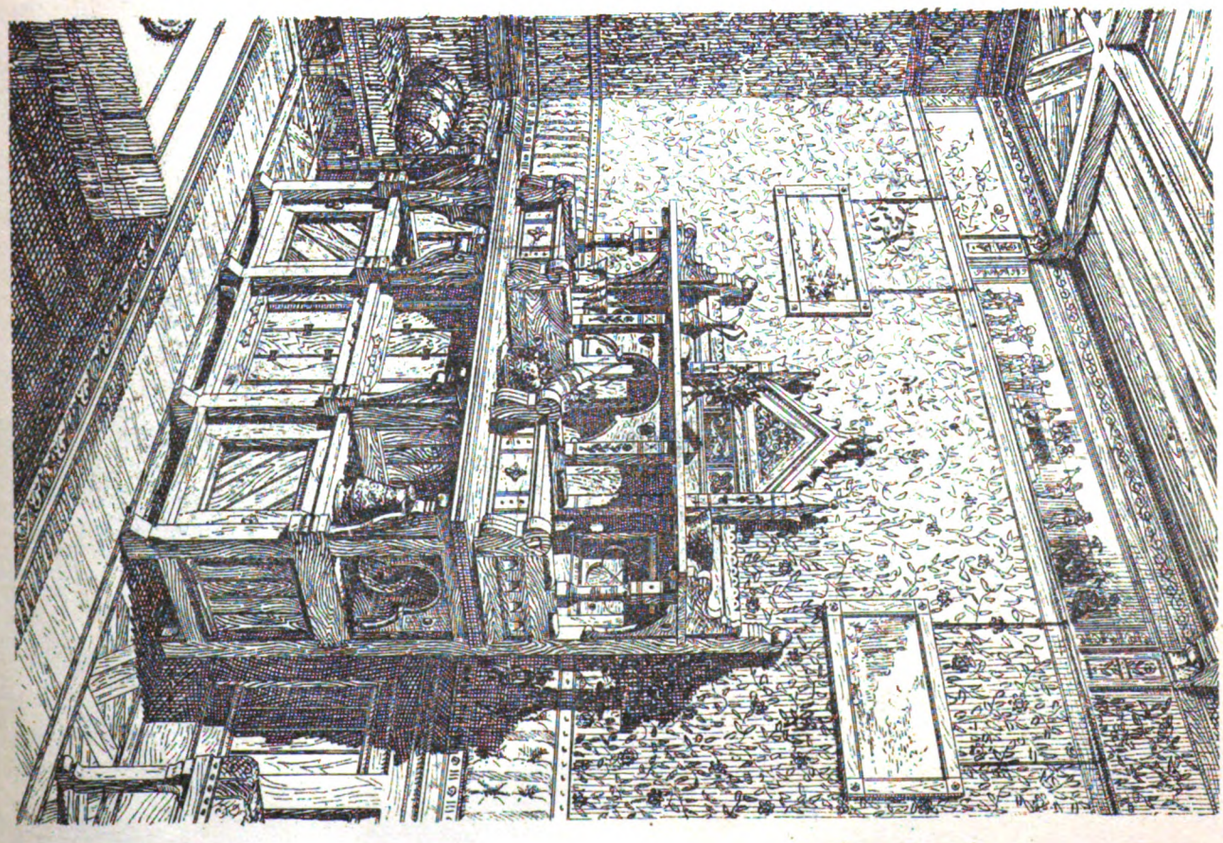
SIDE-BOARD.

MORLOCK & BAYER.



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FERRY & GARDNER ARCHITECTS.

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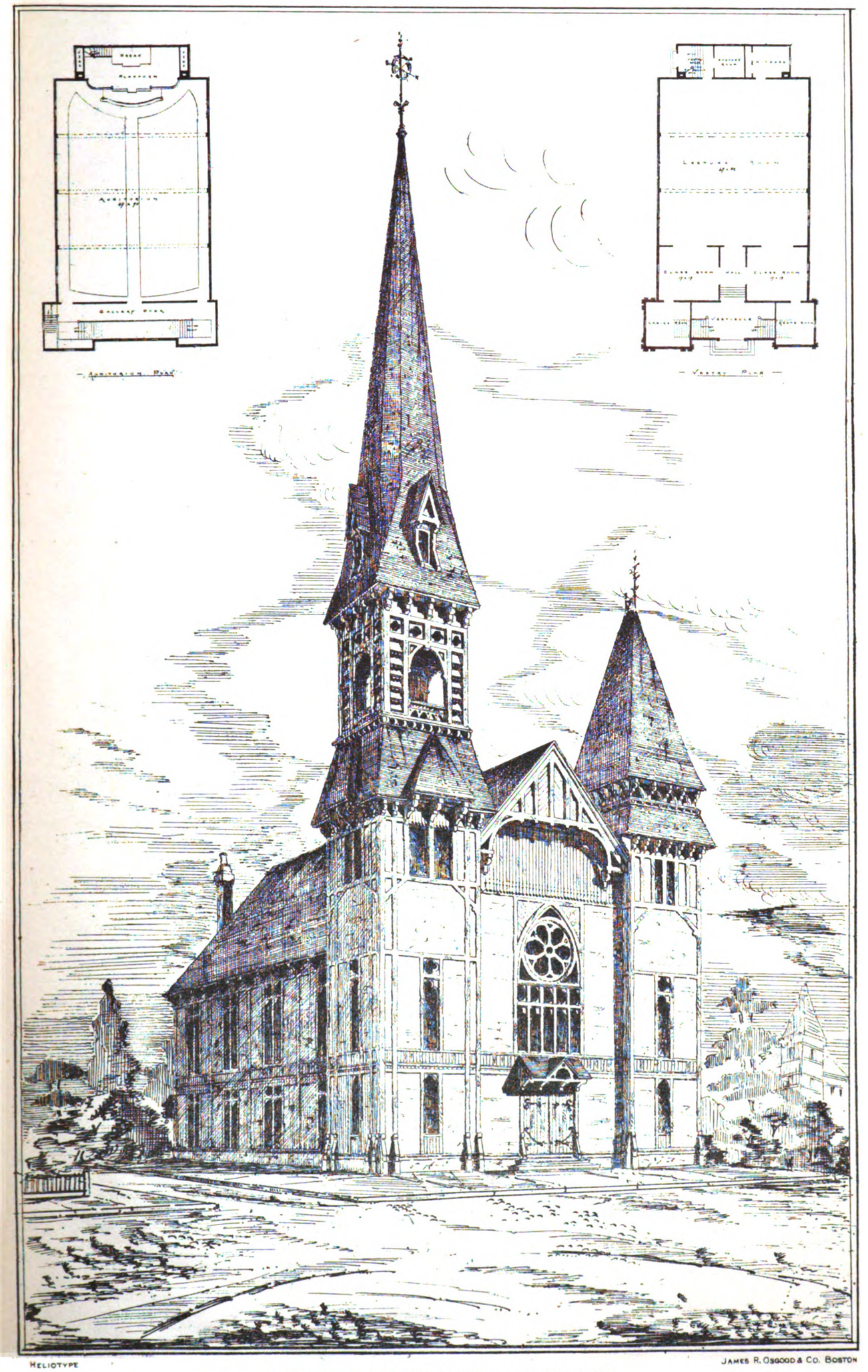

HELIOTYPE

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CHURCH AT FARMINGTON, ME.

STARBUCK & VINAL ARCHITECTS.

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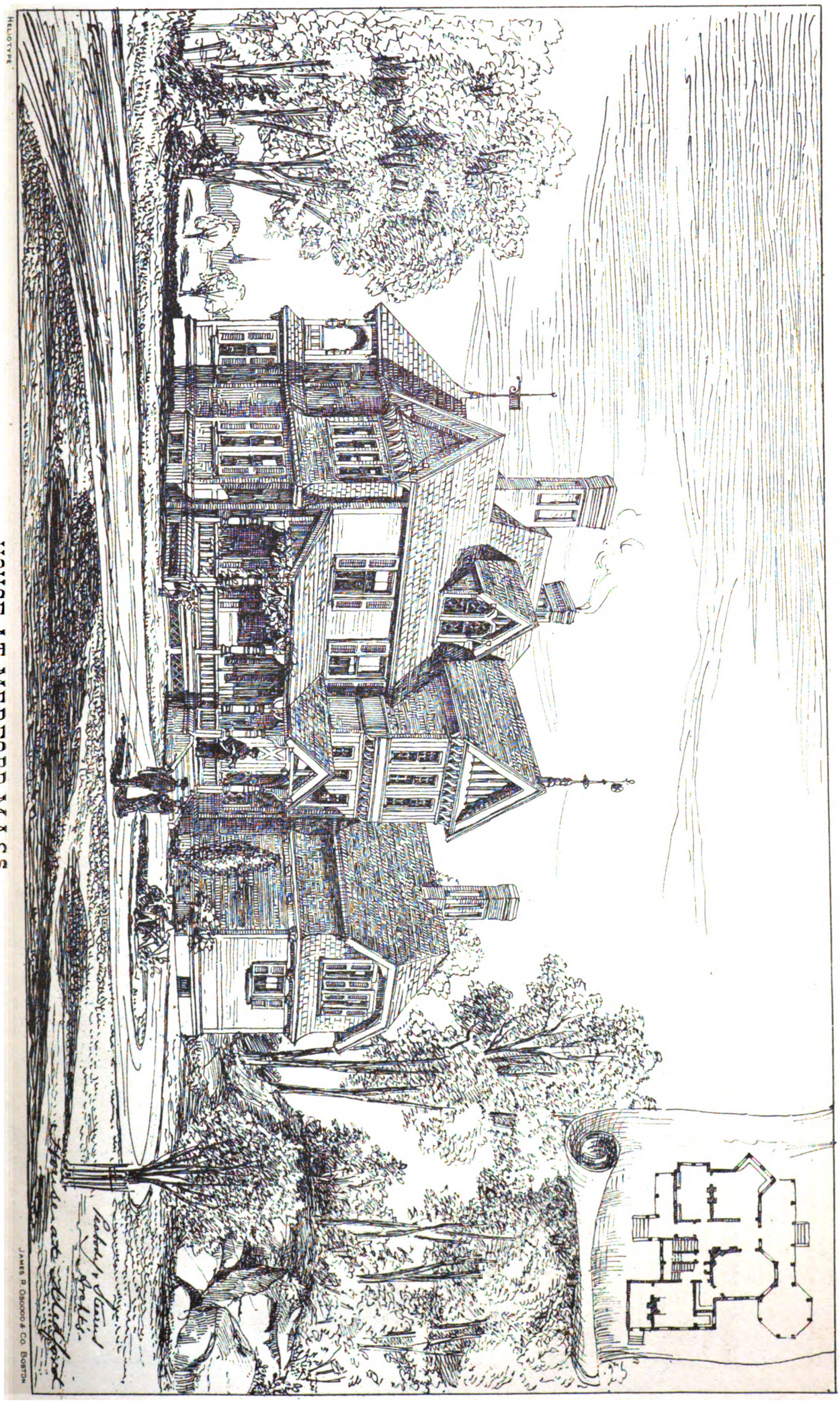

HOUSE AT MEDFORD MASS.

PEABODY & STEARNS ARCHITECTS.

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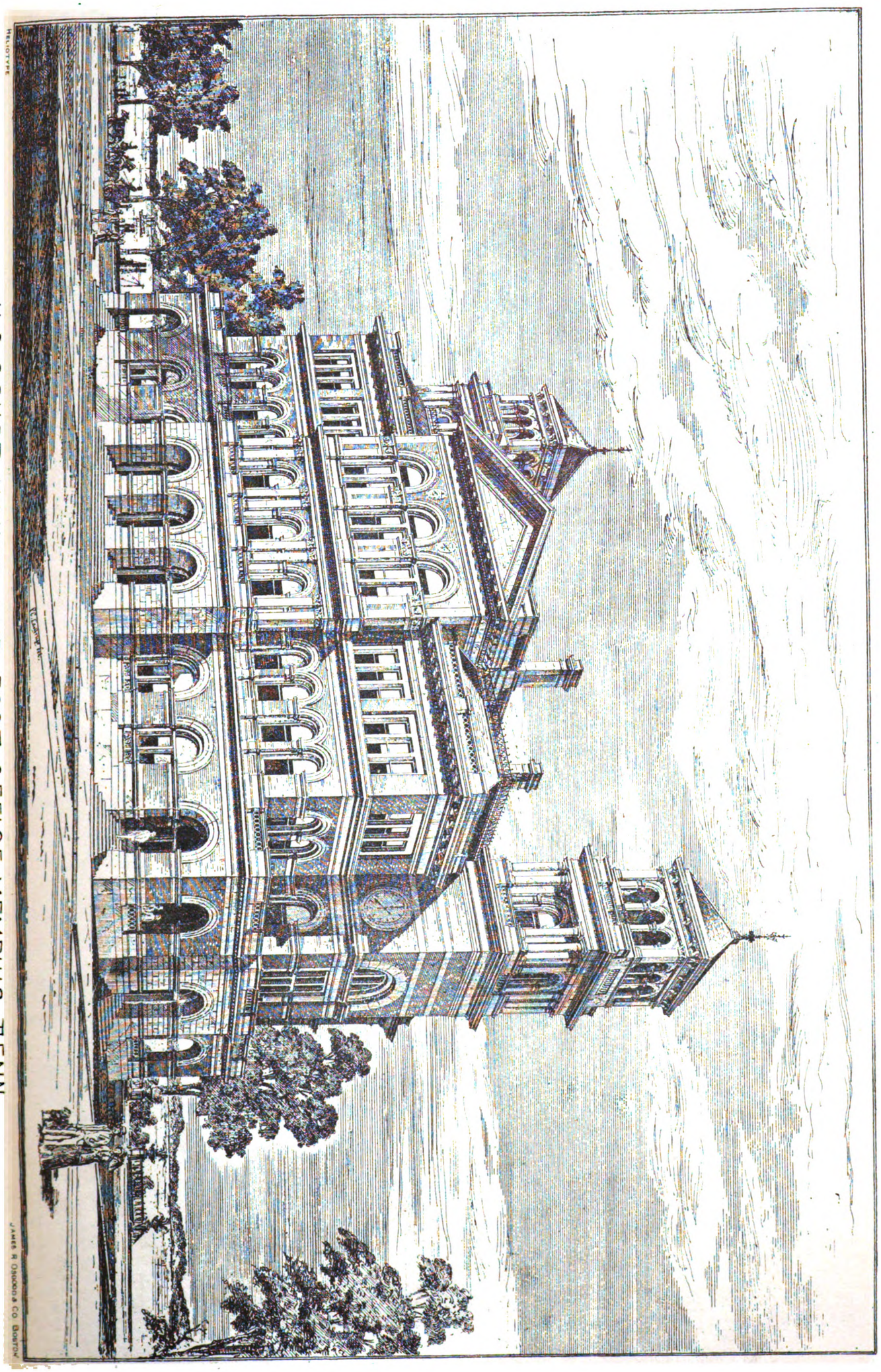

U.S. COURT HOUSE AND POST OFFICE, MEMPHIS, TENN.

JAS. G. HILL, ARCHT.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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THE catalogue of the Massachusetts Institute of Technology for the current year shows thirty-three students of architecture, of whom fifteen follow the regular under-graduate course of the school, and eighteen are special architectural students. The most popular courses, as far as may be judged from the number of students set down to them, are those in civil engineering, mechanical engineering, mining engineering, architecture, and practical design. The respective numbers of these students are 41, 34, 25, 33, and 47, out of a total of 293. We notice that the graduate students, that is, those who have already taken a degree in colleges elsewhere or at the Institute itself, are divided mainly between the courses in architecture and mechanical engineering; eight out of the twenty-two being students of the first, and nine of the second. These numbers compared with the whole numbers in their respective courses are nine to thirty-four, and eight to thirty-three. It is not safe to generalize freely from the record of a single institution; but these numbers are some indication of what is proved abundantly in other ways, — that in these two professions the number is greatly increasing of those who secure the benefit of what is called a liberal education before their professional training. Desirable as this is in any profession, there is scarcely any in which it is so important as in architecture, — scarcely any in which the superior insight, the keenness and delicacy of perception, which a genuine culture gives, tell so directly upon its work; scarcely any to which the various interests of cultivated men, as distinguished from the merely intellectual, are so closely allied. The physician or the lawyer may attain commanding success in his profession with neglect of culture: the architect cannot; and on the whole, the best means that is provided for laying the foundation of culture is a college training.

THE new course of practical mechanism at the Institute has begun with twenty-two students. This, which is arranged as a two-years course, is meant for "those who wish to become master-mechanics rather than engineers, and especially for the large class of pupils to whom such a systematic training will prove a valuable foundation for further engineering or other scientific study." The workshops are not yet in full working order, the course having only been undertaken this year; but a look at what is already doing would probably astonish those who know the progress which learners make in ordinary workshops. We have seen specimens of hand-work in metal executed by new students after only a few weeks' practice, that an average apprentice would hardly equal at the end of two or three years of service. The result is surprising, but the reason is clear. Few people consider the difference in opportunity between the learner who is put into a shop where the carrying forward of the work is the only thing considered, where he is kept only at such rough work as the economy of the shop leaves in his hands, with no one to urge him forward, or select work with a view to his advantage, or spend time in instructing him, — and the learner in a school where every thing is planned for his special progress, and a skilled expert watches him constantly, correcting his errors, showing him at every turn how his work may be best handled, and teaching him carefully the hundred tricks of his trade which he would else only acquire by slow imbibition. It is a great pity that in these times when everybody is complaining, and justly, of the insufficient training of mechanics and the difficulty of getting good workmen, the different mechanical trades do not take the hint to establish schools for the training of their workmen, instead of devoting all their energies, as the trades-unions seem to do, to the encouragement of strikes, to the discouragement of special proficiency, and to lessening the ratio between work and wages.

OF strikes, the most vexatious that has come under our notice lately is that of the engineers of the Boston and Maine Railroad. This strike, which has been expected for some time in consequence of a disagreement concerning wages between the engineers and the company, was undertaken with due warning, without any underhand action, and has been maintained without recourse to violence. Nevertheless, with these reservations it may be said that the thing was deliberately managed so as to be not only as effective, but as annoying as possible. The engineers, acting under the orders of the Brotherhood of Locomotive Engineers, failing to carry their point by the interference of the president of the Brotherhood, gave notice that if their demands were not agreed to at a time which they fixed, they would strike. Accordingly they did strike simultaneously all along the road at four o'clock in the afternoon, hauling their fires, and leaving their engines on the track wherever they happened to be. No one doubts the right of men who are employed by the day to resign their work on any day, nor of any body of them to agree among themselves to give up their work on the same day; and so the engineers had a right to stop work all together at the end of any day's work that they chose. But it was a great wrong and a great meanness withal to do it in the way this was done; for by stopping in the middle of the afternoon, at the busiest point of the day, they did not make their strike any more efficient, but simply inflicted a great deal of unnecessary and to them unproductive annoyance. And the most annoyance was inflicted not upon the railroad company, but upon some thousands of passengers who were in no wise concerned in their quarrel, and against whom they had no grudge, but who nevertheless were interfered with in their business, and kept away from their homes to their extreme inconvenience, because of the refusal of the engineers to fulfil an implied contract.

WE say an implied contract because, morally at least, the man who being paid by the day begins a day's work in the morning undertakes an obligation to finish it, and has no right to withdraw until the end of the day; and we are persuaded that such an implied agreement could be maintained in law, and that a man who quits his work in the course of the day to the prejudice of his employer could be held liable for damages on account of the injury he does. But when a man who is intrusted with a piece of property, a tool worth several thousands of dollars, abandons it in the middle of the highway instead of returning it to the place where it is kept, there can be no doubt that he commits a disgraceful breach of trust, and that he ought to be made to pay for it. The doings of locomotive engineers as such do not concern us, but the question of strikes does, since these are phenomena which unluckily occur in all trades. We question the right of no man and of no body of men to demand whatever wages they can get for their work. The right of striking is like the right of revolution, and the exercise of it is justifiable just about as often; but it is a right which he who uses it is bound in decency, and ought to be compelled by law, to use with no unnecessary injury to his neighbor: yet it is the settled policy in trades-unions to inflict in striking as much injury as can be inflicted without resort to criminal violence, if indeed they stop at this point. The evil has gone so far, and the loss occasioned by strikes has become so serious an injury to the community, that they need to be regulated by legislation. The matter is probably not easily dealt with; but it is very desirable, and we do not see why it should be impracticable,

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to secure laws by which those who engage in strikes should be held closely liable for any loss or damage occasioned by them beyond that which necessarily results from the stoppage of work at a reasonable time. There would probably be no great satisfaction in enforcing such a liability against the individual workmen who strike; but it would be worth while to enforce it against the unions and brotherhoods which direct and sustain the strikes, and which, being rich enough to support the workmen who are thrown out of work by them, are also rich enough to pay for the unnecessary damage they do.

THE first municipal action in favor of cremation of which we have heard is that of the town of Gotha, where the council, which some time ago legalized cremation, has lately decided to erect a *columbarium*, with provision for the burning of bodies. The plan of the structure provides two wings with a connecting portico, — one of the wings being used as a reception-hall for bodies, and the other for the cremation itself; while the portico, as we understand it, is to be the *columbarium* proper, the wall behind the colonnade carrying the cinerary urns, with memorial tablets, and the like. The apparatus to be used in the burning is that of Dr. Siemens, which we have before described (*American Architect* No. 46, p. 361). A late number of *Engineering* gives illustrations of the prize design for cremation-buildings, accepted by the congress of cremationists held last summer in Dresden, by Herr Lilienthal, an architect of Berlin. This consists of a classical chapel, in the form of the cella of a Greek temple, rising above the surrounding peristyle, which connects on either hand by short wings with round buildings something like Romanesque baptisteries. Beyond these, long porticos which will serve as *columbaria* stretch out on both sides. The bodies are burned in furnaces in a building behind the chapel, and the smoke of the furnaces is carried off in a flue which rises through the middle of a high bell-tower in the rear.

HALF a century ago, as is pretty well known, when Mehemet Ali, the ambitious viceroy of Egypt, presented to Louis Philippe the famous obelisk of Luxor, he also gave one to the English Government, — the sister obelisk to Cleopatra's Needle. The Roman emperors brought many Egyptian obelisks to Rome, and the popes have placed and replaced several of them. The transportation of the obelisk of Luxor to Paris, and setting it up in the *Place de la Concorde*, is one of the noted achievements of Louis Philippe's reign. But the English Government, less accessible to sentiment than Roman emperor, or pope, or French king, left their gift lying in the sands of Alexandria, where it lies to this day. Meanwhile the land on which it lies, passing from hand to hand, has come into possession of a Greek who wishes to build a row of villas upon it. The proprietor, having appealed to the Egyptian Government to have the obstruction removed, was referred to the English Government, to whom it belonged; but the English consul refused on behalf of his government to acknowledge any responsibility for the obelisk. Then the proprietor brought suit against the government of Egypt for damages on account of the incumbrance, but was non-suited. Now the question has arisen again whether the English will carry home their present, with the alternative that if they do not acknowledge and care for it, it will be quarried for building-stone. It cost two millions of francs to put the obelisk of Luxor in the *Place de la Concorde*, but nowadays a shipping firm is found in Alexandria which agrees to set up the English elephant on the Thames Embankment for ten thousand pounds.

THE last number received of the *Builder* contains an illustration of the new Court Theatre at Vienna. This theatre is building on the site of the old Löwelbastei, on the western verge of the old city, and on the Ringstrasse, which, taking the place of the former fortifications, divides the old city from the suburbs. It is from the designs of Semper, who, it will be remembered, built the famous Court Theatre at Dresden, destroyed by fire not long ago, which he is rebuilding, and who also completed or rather extended (for we believe it is not yet completed) the new museum at Berlin, which was begun by Schinkel. The design is grouped according to the general fashion set by the modern French architects, showing a preponderating rectangular mass with pedimented roof, above the stage, against the front of which leans a semicircular mass, under which is the auditorium; and around these two are grouped the remaining parts of the building. The conspicuous parts of the façade are a frontispiece which consists of a tetrastyle of Corinthian pilasters, standing on high pedestals, supporting their entablature and a sculptured attic; and on each side of this a curved wing, concentric with the wall of the auditorium, returning to meet the wings that flank the stage. The arrangement, of which no plan is given, must be very like that of the burned theatre in Dresden; but the design is far from having the same beauty. The frontispiece breaks the fine curve of the corridor around the auditorium, which was so marked a feature of the Dresden theatre, while its slight projection gives it no opportunity of redeeming the inconvenience of the latter in having no room in front of the auditorium for any thing but the corridor. The great order which is continued around the wings, and includes three stories, is stilted on its pedestals, and straddles rather awkwardly over the elaborate architectural composition in two orders that occupies the inter-columniations. Nine openings in the porch and the circular wings give entrance to visitors on foot, while carriage entrances are on the extreme right and left; and separate staircases lead from the corridors to the different galleries. The house seats but two thousand, and is arranged with a *parterre* and four tiers, of which the upper and the middle portions of the third are filled with open seats in the American fashion, the rest being occupied by boxes. The stage is seventy-five feet deep, with a provisional stage behind it thirty-five feet deep, which on occasion may be thrown into one with it. The proscenium opening is forty-three feet, and it contains no boxes. Great pains has been taken to secure the theatre against fire, and allow the escape of the audience in case of alarm. The scene-painting room and scene-docks are in a separate building. Two saloons or *foyers* are provided, one for the first and second tiers, and the other for the third and fourth; and small *salons* are attached to the boxes.

ARCHITECTURAL STUDENTS. — VIII.

SKETCH-BOOKS AND NOTE-BOOKS.

THE American architectural student does not sketch as much as he ought. The effect of the neglect shows in his work as a draughtsman, in a certain stiffness and awkwardness of handling, and a helplessness in rendering his accessories that is much too common. Illustrations in our own pages from time to time are only too clear examples of these faults. A European student has his sketch-book or note-book always at hand, keeping it full of valuable memoranda, keeping his hand in practice and his head stored with material for use. It is very likely that a notion prevails that there is a lack of opportunity for sketching in our country, where architecture is mostly new, and on the whole crude, and our towns lacking in picturesqueness. But if there is such a notion, it is a mistaken one. We do lack the temptation to sketching that the picturesque towns and interesting architecture of Europe afford; but there is always opportunity, though the subjects at hand be not the most stimulating. Though our architecture may fail in *ensemble*, and be rather mixed-up and fantastic in design, in the work of our enterprising men there is always something interesting in the parts, whether the whole be satisfactory or not. Or if the surroundings are especially unfavorable as architecture, they are still available as material for practice. The sun shines on good and bad architecture alike; and nothing is so bad that it will not catch the light or cast a shadow. If the student is not able to fill a row of note-books with valuable subjects, he may at least continually practise his eye and hand in drawing what is before him; and if he does this with care enough, he will certainly learn to do it well. But in all the cities in which he is likely to study, he will, when he looks for it, find material enough which will be instructive as well as practicable. Wherever there is a column with a tolerable base and capital, classic or Gothic, wherever there is an archivolt, a pediment, gable, or cornice, there is a study for him in proportion, foreshortening, light and shade.

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Wherever there is a successful feature, — a porch, bay, dormer, or chimney, — there is something which it is worth his while to set down in his note-book.

In all the older towns there is material of value in the buildings of two generations ago. They are almost always interesting in one way or another, and contain detail which, though not the best, has its own merit, and, besides being better than most which is executed nowadays, will give the most useful practice to the student who will draw it. It is fast perishing, and in most cases with no one to make a record of it. Clever cornices, columns, panellings, quaint mouldings and enrichments, old mantlepieces, and stairs with carved posts and twisted balusters, abound in the houses of the last century. By recording carefully what remains of the older work, the student will be in the way of service to the profession, which is beginning to take an interest in it, and will take a greater interest hereafter. He will be giving himself the best training for improving his chances when he is fortunate enough to get an opportunity to travel in countries that are rich in architecture old and new, and where he will need all the dexterity and precision he can have acquired. He cannot spend a short vacation to better advantage than in exploring some country town whose old houses are unspoiled, and making thorough studies of them. He should practise both sketching the general aspect of the things that he finds interesting, and taking exact notes and memoranda from which he can at his leisure make accurate measured plans and detailed drawings. He will find that this is not so easy work as it seems, and probably that after his first visit to any building, his record will be so incomplete that he must return to verify and extend it before he can make his drawings in full. He will be likely also to acquire a wholesome estimate of his own powers. The editor of an illustrated paper knows by wearisome experience how hopeless it is to try to persuade a draughtsman that he cannot draw well; a strenuous wrestle with an old carved chair-back or a carved and twisted newel-post may be more convincing than the most solemn testimony of the elders.

In like manner it is very useful for the student to fill his note-books with scraps of whatever he finds most interesting in professional books or journals. It may seem unnecessary or useless to do this, because the books and the journals are always at hand. But they are not always at hand to him, unless he has a library full of them; and if they were he would find at the moment of need, that he had not time to look them through, or that he did not know just where to look for the thing he wanted; or he would have forgotten that it existed. He will find that the habit of noting down carefully what he meets with will add wonderfully to the clearness of his recollection of it; and that to read and examine with an eye to making notes is an excellent tonic to his digestion of what he reads. He will be able too by this means to classify and arrange his knowledge as only an unusually capable person can do by the aid of his memory alone. His reading or experience will be continually bringing before him points of detail in design or construction, — capitals, floors, chimneys, masonry, bases, cornices, plumbing, trusses, ironwork, graphical constructions, — in such confused succession, that it will be long before he learns to group and compare each class in his mind; but a few sheets of notes in which he has carefully arranged them will clear up their relations more than months of desultory observation. The student who has neglected this sort of work will, if he takes it up, probably be astonished to find how much material the most unpromising surroundings will provide for him, and how much a little method in the arrangement of his notes will add to his understanding of what he has seen, and to the resources he has at command for his work. Besides this, the constant making of careful sketches or even tracings of what comes under his eye will unconsciously familiarize him with a variety of means of rendering and knowledge of effect. He will discover with delight in some sudden emergency that he has resources at command which he did not suspect, and of which he can hardly tell the origin.

The draughtsman's pencil should be always at hand and always in use. He should turn to it for illustration, or to occupy an idle moment, as instinctively as the traditional soldier lays his hand on his sword. The mere habit of constant scribbling is by no means a useless one, provided it is not absolutely aimless scribbling. A skilful violinist once said that if he should omit to practise his scales one day, it would take him a week to get his skill back. The constant use of the pencil or the brush is almost equally indispensable. To be a ready and efficient servant, it should be always in service. An American artist who had spent many years abroad was asked once by a brother artist how he got his astonishing command of his pencil. "I am always drawing," he said: "if I wake in the night, I stick my toes out of bed and draw them." Not only constant but varied practice is necessary. Architectural draughtsmen are too apt to narrow themselves to doing one thing, or else to one way of doing every thing. Many are at sea as soon as their pen leaves the edge of their square or triangle; others seem to be at home only on the side of a building. Some can draw tolerably in one style, and not in another, — Gothic work and not classic, or the reverse. It is not uncommon to see a drawing in which one part is cleverly handled, while the rest is little better than imbecile. Here also there is benefit in the study of our older buildings. The chief characteristic of our present American architecture as a whole is its want of breadth and simplicity in treatment. The same characteristic is noticeable in our drawings, in which repose and "keeping" are often set at defiance. Our older architecture is almost always quiet, broad, and simple. To be sketched appropriately, it must be sketched in a quiet and simple manner. If a habit of drawing it should disgust the student with the restless, broken character of much of our late domestic work, with its countless angles, peaks, dormers, and bays, and lead him to prize the quiet beauty of broad surfaces, harmonious outline, and continuous lines, it would do him no harm.

Whatever is the student's regular habit of work, let him practise a different one, — an opposite one, if he can find it. It will open his eyes to many things which will otherwise pass his notice. If he is addicted to classic work, let him take an opportunity to draw Gothic; it may prevent his falling into dulness and monotony. If, as is more likely, he is used to modern Gothic, let him try classic, and learn the value of peace and quiet. If he commonly uses the brush, let him try the pen: he will acquire a new resource, and his work will probably gain in vivacity. If he is in the habit, as is common, of dashing about with pen and ink, let him practise with the brush, and get command of breadth of effect. Above all, let him sketch carefully, not forgetting what we said in our last article of this series, and what every considerate artist will bear out, — that good sketching consists in leaving out what you can spare, and rendering as carefully as possible what you choose to keep. And let him sketch a-field. There is much that he cannot well learn to draw except by drawing it *in situ*. Study of constructed drawing, though it will correct many of the gross errors into which draughtsmen are apt to fall, and though it cannot safely be neglected, will never put a circle or any curve or group of curves into satisfactory perspective any more than a knowledge of the skeleton will suffice for drawing the figure. It needs the additional correction of the sensitive eye, and the eye is made sensitive mainly by practice from the model. The foreshortening of a base and capital, the curves of an archivolt in perspective, of the cinctures of a shaft or a round tower, will be learned but slowly in office work, if at all. Most of our draughtsmen do not draw them tolerably, because they will not stop to learn their business. Out-of-door drawing and variety of subject will give the student an alert attention and ready memory which will enable him to draw with right decision what his work requires, and to complete his drawings when he needs, with accessories that will not be shamed by any cleverness of his technical work.

STUDIES OF INTERIOR DECORATION.

BY HENRY VAN BRUNT, F. A. I. A.

I.

IT is generally assumed that taste is a quality more or less indigenous in every human being; it is supposed to be developed in each one of us in proportion to our opportunities, and according to the accidents of our position and surroundings; it is a quality therefore, which no one, as he values his reputation for good breeding or culture, can permit to be questioned. From this point of view it does not necessarily presuppose study or intellectual exertion to any appreciable extent; yet taste is certainly considered a touchstone of gentility. Now we are born to the periodical neces-

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sity of having new things, — new clothes, new furniture, new decorations. These are the opportunities of taste. As for clothes, we are all of us, men and women, spared the necessity of cultivating individual convictions in the matter of taste, by the fact that at any given time certain well-understood forms and styles of dress prevail, — certain fashions, concerning which it may be said that practically there is no disputing. We take what our tailor or our milliner gives us, with but a show of questioning; and our choice, if any, is limited to a few capricious variations all loyal to the fashions of the moment. Thus but little strain is put upon our æsthetic faculties, and our taste remains unquestioned.

The next of the opportunities of taste in the order of frequency are perhaps, interior decorations and furniture; and here also the submission of individuality and independence is well-nigh complete. It is true that the man of taste spends a good deal of time in the shops with upholsterers, carpet and paper dealers, and decorators, making laborious choice. But it remains true that the range of his selection is within the limits, pretty strictly defined, of a prevailing "style," as it is called, which is governed by some mysterious laws, changing we know not why from year to year, so that the interior which his taste furnished and set forth a few years ago is a fundamentally different affair from his interior of to-day. Taste and fashion thus appear to go hand in hand, and there seems to be no disputing about either.

We are continually surrounded by the results of this capricious sovereignty of fashion. Our children grow up in the midst of it. It enters into their lives; and by slow, unconscious processes of amalgamation or absorption, the essential folly and caprice of it perhaps become their habit, and a part of their characters. If therefore, so far as regards the question of interior decoration and furnishing, there be any rational or logical method of developing this scenery of our domestic lives from the mere blankness of a shelter to the fulness and completeness which are essential to the highest civilization, it becomes the part of intelligent creatures to seek for it. If it be possible to create an expression of *perfect fitness* in every room by a sober study of its conditions, and by the considerate use of such resources as we may have at command, the monarch of caprice is dethroned; he has become our slave; and a new field is open for art.

It is a common experience with the architect to find that occupation and use, instead of improving and justifying his architectural forms and dispositions, are a positive injury to them. Rooms which should appear high are so treated by the occupant as to seem low; that which should be light is dark; that which should glow with warmth is gray and cold; that which should invite to repose is noisy with discordant colors and shapes; that which should give a hospitable welcome is formal and forbidding; that which should be elegant is merely costly. None of the opportunities offered by his design for a decorative treatment of especial interest are made use of; and the best results of his artistic intelligence are thus often set at nought, after his own professional responsibility has ceased, either by an unconscious want of sympathy on the part of those for whose comfort and well-being his work has been intended, or by the elaborate interference of that taste which is the handmaid of fashion.

This is true not only of domestic architecture, in which the opportunities for such misuse, with the inevitable results of discord, are more apt to occur, but of more monumental structures, — of churches, theatres, and public halls, — in which at a certain stage of the work the architect too often vanishes into the background, or suffers himself to be supplanted by another whose function is the decoration or completion of the interior. This new official brings to the work a contribution of forms and fancies in accordance with the traditions and conventionalities of his craft, and subservient to certain prevailing fashions which may or may not be in harmony with the intention or sentiment of the building, and which certainly cannot recognize all its capacities for original and especial treatment. However skilful, he can hardly enter into the spirit of the work with the same impulse or inspiration as its originator.

If the exterior design of a house is a matter too far removed from the sympathies of its occupant to be quite understood and appreciated by him, the interior design, that is, the treatment of the walls, floors, and ceilings, is a thing from which he cannot escape; his family and his friends are sensibly or insensibly affected by it; it gives a color and significance to domestic life; it gradually refines or vulgarizes the household, as the case may be. Thus interior decoration would seem to be the point by which architecture can approach most closely to the apprehensions of mankind. It is, or should be, the interpretation and complement of the plans and elevations; it should complete, correct, and explain them; the whole should constitute a unity, a concert of many arts. If this is true of domestic architecture, it is more conspicuously true of all civic and religious monuments. All the details, however minute, which are essential to their complete and perfect adaptation to human use, are a part of the original conception, and should have each its proper and indispensable part to play in the harmony of forms and colors which make up the whole. The interior decoration is that last touch of architecture by which it is brought into sympathy with the occupants.

Therefore, as architecture is a fine art and not an accidental growth, this part of architecture must be governed by certain principles of design, and not by caprice, fashion, or undisciplined taste. It should be understood in the outset, however, that these principles are not of such a character as to produce results mechanically; their function is to establish boundaries, within which imagination and invention may profitably work. The expression of *perfect fitness*, of which, as we have intimated, every room is capable, and within reasonable limits of expense, can be obtained only by the application of such principles.

What are these principles, and how are they to be applied?

We propose to present a series of studies of interior decoration, and by a careful analysis of the motives of composition as they occur in the process of reaching final results in each case, we trust we may be enabled to answer these questions without offensive dogmatism, and in a manner which shall commend itself to common sense.

THE ILLUSTRATIONS.

RESIDENCE AT ROCKFORD, ILL. MR. P. B. WIGHT, ARCHITECT.

(145 Clark Street, Chicago, Ill.)

THE solid block of the house is sixty-six feet and six inches square. Two projections on the sides are ten feet each, and one on the front is the same, making the exterior dimensions, width, eighty-six feet and six inches; depth, seventy-six feet and six inches. The materials of the exterior are, for the basement, white limestone; for the walls, red pressed brick, with bands of black and buff brick. The decorations above the basement, including the cornice, are terra-cotta. The verandas, porches, and lantern in the roof, are wood. The house will be built during the coming season.

INTERIOR. MESSRS. KIMBEL AND CABUS.

(7 and 9 East Twentieth Street, New York, N.Y.)

STORE NO. 21 GREEN STREET, NEW YORK. DESIGNED BY C. W. ROMEYN, ARCHITECT.

(124 West Thirteenth Street, New York, N.Y.)

CORRESPONDENCE.

AN ARCHITECTURAL YEAR.

LONDON.

THE year 1876 has passed away without any thing very great in architecture having been accomplished in England. True, there are several important public buildings in progress; they have advanced a stage towards completion; probably one — the Manchester Town Hall — may be said to have been finished during the year, and an instalment of the coming National Gallery in Trafalgar Square has been opened; but none of the others, such as the new Law Courts, the Natural History Museum, etc., are in any thing like a completed state, so that the architectural history of the year, so far as public works are concerned, may be said to be a record of fragments. The Wellington Monument, which was promised to be opened to public inspection in November, is still hidden behind its boarding, and seems likely to remain so for some time longer; but on the other hand, another great national monument has been completed. The statue of the Prince Consort has been placed in position on the Albert Memorial in Hyde Park. Very different in this respect from most of such memorials, the uncovering of this statue was unattended with any public inaugural ceremony, probably because the mighty shrine itself had been waiting in a completed state for its tardy occupant. Now that the Memorial is entirely finished, its effect can be truly judged; and whatever may have been the opinion of the taste which gilded so much of the shrine, surely there can be but one idea as to the propriety of gilding the central statue itself. Any thing more unfortunate in its results could hardly be imagined. That the statue is evidently a fine one (if it could only be seen) there is no doubt; but from the glare and glitter of the burnished metal it really does not very much matter what it is: it is a blaze of gold, and that is all that can be said about it. Whether it is a good likeness, whether the modelling is vigorous or delicate, cannot be told; all detail, all light and shade, all repose, all that quietness wherein should lie its strength, are alike lost in dazzling splendor, distracting the eye, and offending one's ideas of good taste. The delicate, finely cut figures of the white marble podium and the equally fine white marble groups at the angles seemed to demand a similar marble central figure as the key-note of the whole; but this huge gold statue seems to crush them out of existence, and destroys the harmony of the whole work. After all the labor, skill, and money that have been lavished on this the richest of our monuments, he would be a bold critic who would contend that the result is worth the candle, or in any way commensurate with the resources devoted to its attainment.

In the provinces, besides the hall at Manchester just mentioned, perhaps the most remarkable building finished during the year has been the Leicester Municipal Offices, — remarkable, apart from the great merit of the design, as being the first public building of any note erected in the so-called Queen Anne style. Two or three years

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ago the advocates of the new style were content to claim for it a special adaptability to private dwellings of all sorts, as the legitimate result of good honest building in brickwork. The year which has closed has seen a striking advance in its development. It was soon found that to have any claim to be a style at all in the true sense of the word, it must be capable of doing all that may be required of it; accordingly we find that the region of public buildings has been invaded with a vigor and success which show that its disciples are thoroughly in earnest, as well as what we may expect in the future. Mr. Bodley led the way with the offices of the London School Board on the Thames Embankment, only to be closely followed by Mr. Hawes in the Leicester building above mentioned, and by Mr. Johnstone in the Middlesborough Assembly Rooms, and again by Mr. Jackson in the new Examination Rooms at Oxford, designed during the year and about to be carried out. These are a great advance from private houses, or the Board Schools of which we have so many in London, even though some of the dwelling-houses, such as the mansion of Kinmel, built by Mr. Nesfield in North Wales, are as large as many public buildings. The latter work, by the way, is probably the largest and most complete of the Queen Anne houses yet built. It comprises a sumptuous suite of reception-rooms, splendid hall and staircase and chapel, as well as a large number of private apartments and extensive offices; all carried out within and without with that thoroughness and power of artistic effect for which Mr. Nesfield's work has always been remarkable, so that it is perhaps not too much to say that this mansion-house is probably the finest piece of so-called Queen Anne work that has been done since the days of the real "Queen Anne" which Wren did at Hampton Court. It is palatial and yet picturesque, quaint without eccentricity, stately without severity, as such an English home ought to be. Like the Leicester Public Offices and the School Board Offices on the Embankment, it is built of red brick with stone wrought work, and in general feeling approaches more nearly a free treatment of Italian than the many quaintly designed houses entirely of brickwork (mouldings, carvings, and dressings) which we are accustomed to associate with the style. Business premises also have come under its influence. Since Mr. Shaw's well-known New Zealand Chambers in the city and the Bank at Charing Cross were built, quite a crop of business houses and shops have appeared in red brick. We hear that the art firm of Messrs. Morris and Co., than whom no men have done more to cultivate and develop the prevailing taste, intend to open a shop and warehouse in Oxford Street, in order that their peculiar works may be brought more under the notice of the general public than could ever be the case at their present place in Queen Square.

In several of the more important competitions also during the year, such as the Nottingham Educational Buildings, the Leeds Public Offices, and the Examination Rooms at Oxford, Queen Anne designs have not only been sent in, but have carried off honors, — in the last-named, the first prize, which is to be built forthwith, and in the first-named, the second prize,— while in the case of the Leeds building only a few Gothic designs were sent in out of twenty-four, results which a few years ago it would have been impossible to obtain. Thus in reviewing the progress of architecture during 1876, the most notable feature in England has been the rapid development of what has now by common consent come to be known as the Queen Anne style; but at the same time it must be admitted that very little of it is like any thing erected during Queen Anne's reign; indeed, in a discussion on a paper by Mr. Birch "On Seventeenth-Century Architecture" at the Institute the other evening, it was suggested that a much more suitable designation would be that of the "Stuart" style, seeing that it is founded on that period of English architecture coming between the Tudor and the Hanoverian eras. Be that as it may, in spite of the unfortunate name which will now probably stick to it, in spite of all manner of abuse and opposition from Goths and Greeks, the style has made more rapid progress during the last twelve months than in any similar period since its revival, if revival it can be called where there is so little to revive. The fact remains that in all departments of building except church work, striking examples are now to be found. It is not to be supposed that the church will escape; indeed, we know of one competition at least, where a remarkably clever Queen Anne design was sent in, and though it was not accepted, the Gothic tradition proving too strong for its chance, it still shows the tendency of the prevailing taste, and that it is only a question of time when we shall have Queen Anne churches, as well as schools and mansions and warehouses. Then again not only in architecture proper, but also in the kindred arts, such as glass-painting, decoration, furniture, metal-work, etc., the age of mediævalism seems past, and a modified Renaissance seems taking its place. Whether all this change is fraught with benefit to architecture as a fine art, yet remains to be seen. It is too early yet to predict whether it is but a passing fashion, or destined to take its place among the great phases of art; here we chronicle only the events as they pass, looking forward to the year upon which we have entered for the continuation of the story.

LIME IN THE EYE. — It is said that a little sweet oil dropped into the eye will counteract the irritation caused by a grain of lime.

PUBLIC BUILDINGS IN ILLINOIS. — THE NEW STATE HOUSE.

CHICAGO.

IN the architectural annals of Illinois, three important buildings now being erected will always occupy a prominent place. These are the State House, the Chicago Custom-House, and the Cook County Court-House also in Chicago. All of them will rank among the largest buildings in the country; and each one is likely to exceed in cost four millions of dollars. Each has an interesting history, like that of most other public buildings, full of lessons both to the profession of architects and to public officials, which, as usual, are likely to be of little benefit to either. They have all received more or less publicity through the columns of the *American Architect:* it is therefore unnecessary to enter into a detailed account of each.

The Illinois State House is now attracting the largest share of public attention. This is occasioned by the appearance of the fifth biennial report of the commissioners and the architect to our biennial legislature which is now in session. This body is now meeting for the first time in the new building, which is still far from completion. But the money is all spent, and it is most likely that the building will have to stand as it now is for a year at least.

Springfield, though the capital of the State, is a place little frequented by travellers, and is without any attractions except the grave of Lincoln, and the brick monument veneered with granite which has been erected to his memory. It is a city of only twenty thousand inhabitants; and, being a place of little business, has not partaken of the spirit of growth which has possessed other cities of the State. The State House is the only building of any note that has been erected there during the last ten years, and has been seen by very few besides those who are called to the capital by business. In such a location it is hardly likely ever to attract much attention as an architectural monument. It is therefore well calculated to astonish those who happen to see it for the first time, by its great size. I do not remember the dimensions, but it has a dome three hundred and sixty-one feet high from the ground line, and said to be seventy-four feet higher than that of the National Capitol.

The designs of J. C. Cochrane, of Chicago, were adopted in 1867 in an open competition, and the building was commenced shortly afterwards. In 1870 Mr. A. H. Piequenard, who had been Mr. Cochrane's partner in Chicago for two years, became a partner in the State-House business, and removed to Springfield, where he resided as acting architect until his death in November, 1876. Mr. Piequenard made important changes in the design of the building after the basement story had been erected. The most noticeable of these were the enlargement of the dome, and the very elaborate inside finish. Before Mr. Piequenard came upon the scene, Mr. Cochrane had prepared the full drawings and specifications for completing the building, which were submitted to an examining committee of the Legislature in 1869, and by them to a committee of experts, consisting of two architects and one master-stonecutter, in order that a detailed estimate of the cost might be made. At this time the basement story had been erected at a cost of nearly half a million dollars. The estimate of the experts for completing the building was a little more than three million dollars, and did not vary materially from that given by the architect. But the commission of experts in addition to submitting estimates, recommended that certain improvements in the character and material of the inside work be made, which would increase the cost by nearly three hundred thousand dollars. This amount however was included in their three million estimate, and should be deducted from that to show what the building would cost as designed. The exact total of the experts' estimate, including the basement story already built, was $3,496,727.53. This was estimated for the mechanical work on the building alone, and did not include the architects' fees, the commissioners' and other salaries, and necessary incidental expenses, the furnishing of the building, the improvement of the extensive grounds, nor fences, gates, and sidewalks, estimated in the aggregate by the commissioners to cost about three hundred thousand dollars. These estimates and omissions bear an important relation to the subsequent history of the building. The legislative committee approved the plans and estimates, and authorized the State-House commissioners to proceed with the erection of the building according to the estimates and recommendations.

In 1870 a new constitution was adopted; and though its main feature was the prohibition of special legislations, its framers had so little faith in the honesty of the Legislature or the State-House commissioners, that they inserted a clause to the effect that the Legislature should not appropriate to be expended on account of the new Capitol grounds and the construction, completion, and furnishing of the State House, an amount exceeding $3,500,000, without submitting the matter to a vote of the people of the State.

The commissioners seem to have accepted the responsibility imposed on them by the constitution, with confidence in their ability to comply with its terms. They expressed this in their reports up te 1875, when all the money had been expended except $800,000. But in the report just presented they say that they made the discovery just after the last appropriation was made, that they were going to fall short of what they needed. Now that the facts must come to light, they admit that they authorized the architects to improve the character of the inside work and *enlarge the dome*,

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immediately after being authorized by the legislative committee to go on with the work in 1869. Their excuse is, — and though to architects it is a good one, to financiers it will be considered very weak, — that the improvements recommended by the committee of experts, and which they thought they were bound to carry out, compelled them for consistency's sake to introduce corresponding improvements and embellishments throughout the whole building. It may be well to state here of what the improvements suggested by the experts were to consist. They were these: "We also recommend that the floors of the rotunda and the halls of the basements be of marble, instead of Joliet flagging; also the hall floors of the second and third stories to be of marble instead of wood; also that the columns, pilasters, arches, rails, and balusters enclosing the grand stairway, be of marble instead of iron; also the wainscoting and soffits of grand stairway be of marble instead of plaster, — because such change is necessary to make the whole harmonize."

But as the experts said that these things were "necessary to make the whole harmonize," it must be inferred, if they knew what they were about, that changing all the rest of the interior was unnecessary for harmony. Whether it was or not, it must be admitted that the commissioners were very liberal to the architects; not in paying them, for the work was done for a fixed sum, — 2½ per cent on $3,000,000 added to $5,000 premium, or $70,000 in all, — but in giving Mr. Piequenard an opportunity for the free exercise of his exuberance in ornamental designing. In this he has more than realized all that was expected by those who knew him. Notwithstanding all that has been said in detraction by the Chicago *Tribune*, which has declared unrelenting war against the State-House and Penitentiary Commissioners, the interior ornamental work of the rooms and corridors offers fine examples of the latest developments of French Renaissance decoration, and probably the most elaborate in this country. The plastering is on wooden lath, ¾ x ¾ inch, and set ½ inch apart. The brown mortar is half cement, to give hardness sufficient to carry the *carton-pierre* ornamental work, all of which is nailed on. No cast-plaster ornament is used, all moulded work being in *carton-pierre*. The greatest fault in the interior work is in the use of this material in connection with the hard-wood finish as an imitation of carving. Not only are the grand stairway and wainscotings of the corridors in marble and polished granite, but the rotunda is mostly faced with stone and polished granite. The chambers of the House and Senate are vastly more elaborate than originally designed, and when decorated will far surpass in effectiveness — as I believe they do even in size — the Senate Chamber and Representatives' Hall at Washington.

Of the exterior of the building the impression given is not so favorable as that of the interior; and one cannot help feeling that this is one of the last domed State Houses of what may be called the "vernacular American type" that we shall see erected. Since old-fashioned Connecticut has got out of the rut and accepted a progressive style, notwithstanding her adherence to the traditional dome, we may fairly hope to see the dawn of a new era in public architecture. The Illinois building is greatly disfigured by the mansard roofs which cap what are called the "wings," but are in reality the most important parts of the structure, being intended for the two legislative bodies. The mansards are low in proportion to the whole height of the building, and of convex shape, covered with stamped zinc scales which are unduly prominent and mainly serve the purpose of advertising the zinc ornament business. The mansards are on no other part of the building, and where they are serve only to enclose the roof-trusses, where a sloping roof would have answered as well. The dome is an improvement on the original design, and by itself would look well, the proportions being well studied; but it is only partly of stone, and sham materials are extensively used in it. The exterior of the building may be improved somewhat by the four Corinthian porticos, but they will only serve to demonstrate again how money can be spent uselessly on public buildings.

The present condition of this immense structure is as follows: The main shell of the building is enclosed and roofed without porticos; the dome is barely roofed in. The rooms and offices and some of the corridors of the first story are completed. The chambers of the Senate and House are finished enough for occupancy, together with their corridors and rooms. The whole of the basement and the interior of the rotunda and dome are all unfinished. Very little furnishing has been done, and that of a temporary nature. A few rooms only have been decorated in color. The surviving architect in his report gives a list of things to be done, covering two pages. His estimate of the amount necessary to complete the building is $666,889.30. There is much material worked and on hand for the uncompleted work.

The *status quo* of the building financially is now as follows: At the date of the report Dec. 1, 1876, there remained unexpended of the three and a half millions, only $67,783.37. All work has been stopped, and the Legislature has no constitutional power to finish the building. The only thing that can be done is for the Legislature now in session to authorize a popular vote on an appropriation of money, and this cannot be had until November next. Therefore the building must stand as it is for a year, and will inevitably deterioriate in that time, as it is not in condition to take care of itself.

In its present state, notwithstanding all its defects and much bad work which must be corrected, it certainly shows more for the money than any other public building of its kind that has been erected within ten years. If completed and furnished for the amount estimated by the architect — only half a million of which will go directly into the building, making the total cost a round four millions — it will certainly be the cheapest public building of its size in the country, and, if not a model of administrative ability, will show at least what can be accomplished by the use of public money through the hands of a board of commissioners whose integrity no one has reason to question.

THE DRAINAGE OF COUNTRY HOUSES.

PROVIDENCE.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — I have been very much interested in the communications which you have published in regard to drainage of country houses; and feeling convinced that the use of the tight cesspool is the only safe plan, allow me space to describe a very common method of constructing rain-water cisterns and tight cesspools which obtains in this vicinity, and which is found to be not only cheap but very durable, provided the soil is not too sandy or too full of springs of water.

Excavate a cylindrical hole of the desired diameter and depth, taking care that the sides do not cave in, and give the sides and bottom a coat of hydraulic cement about an inch and a half thick, leaving the surface rough, and when sufficiently set put on a second fine coat, which should be left smooth from the trowel. The bottom is dished, and the coating of cement is carried down the sides and across the bottom. It is sometimes necessary to give the whole cesspool an additional thin coat before it can be warranted to be tight. The sides should be cemented only to within about three feet of the surface of the ground, and a skew-back formed with the cement to receive the springing course of brick for a brick dome, with which the cistern or cesspool is to be covered instead of with large stones.

This dome is laid but four inches thick by ordinary brick-masons, without a form or centre, and then covered all over with a coat of cement.

A man-hole of any required diameter is left in the centre of the dome, and carried up to the surface of the ground by a brick ring, and capped with a cast-iron flanged ring and cover. The iron ring should cover the top of the bricks to protect them from frost or water, and should be set high enough to allow the ground to be graded with a fall from it in every direction if possible. A perforated cover like those used for sewer man-holes is to be preferred, especially if the cesspool is ventilated as described by Mr. Bayles.

A. S.

BUILDING-ACCIDENTS AT TRINITY CHURCH, BOSTON.

BOSTON, Feb. 14, 1877.

EDITOR AMERICAN ARCHITECT.

Your correspondent Mr. Smart, in your last number, is not quite just in implying in his communication that the fatal accidents that occurred during the construction of Trinity Church were due to the negligence or parsimony of the contractors. Of the three men who lost their lives on the work, the first, while laying stone, allowed the tenders to pile up beside him a mass of material until the weight broke down a staging quite strong enough for its proper service. The second, engaged alone in taking down a stage, laid some planks aside, and afterwards carelessly walked out upon one of them until it tilted, and he fell.

Both of these misfortunes, though the first might have been prevented by extraordinary care in supervision, cannot be attributed to any thing but the carelessness of the sufferers.

In the third case, the men were throwing stone chips and rubbish from the top of a finished wall, under careful supervision, a guard having been constantly stationed at the foot of the wall to warn off the other men. Early one morning, before either the guard or the foreman had arrived, the men on top of the wall threw off some chips, one of which struck a man passing below, fatally injuring him.

This was almost criminal carelessness on the part of the workmen; but the contractors had done all they could, as it seems to me.

Mr. Smart should receive all possible sympathy and encouragement for his efforts to defend the lives and happiness of workingmen; but it will not hurt his cause to be set right in regard to parties so conscientious and considerate in regard to their workmen as the contractors for Trinity Church.

T. M. CLARK.

CORRECTION.

TO THE EDITOR OF THE ARCHITECT AND BUILDING NEWS.

Dear Sir, — In the editorial notes of the issue of Feb. 10, *in re* Withers *vs.* Cushing, my name is misspelled; it should be Oswell, *not* Oswald. I shall be glad if you will make this correction.

Yours respectfully,

A. E. LLOYD OSWELL.

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JOURNEY OF AN ARCHITECT IN THE NORTH-WEST OF EUROPE.[1] — V.

THE people of the North, so skilful in all carpentry work, are not less so in the manufacture of furniture. They know perfectly well how to give to all kinds of wood those forms which correspond to its nature and the purpose for which it is intended. Timber is still plentiful in Northern Germany, and it has supplied builders with materials which they have so happily employed in the decorations and furniture of their dwelling-houses. As German masons have respect to the value and nature of the stone which they employ in their buildings, so do their cabinet-makers study the value and nature of wood. They employ it according to its characteristics and qualities, avoiding useless waste and large curved portions which interfere with the grain of the wood; but, on the contrary, they always form combinations with it in the direction of the fibres, and so preserve all its strength. As to the taste shown in the execution of this kind of work, the reader must judge for himself.

Thus, instead of our plaster ceilings — which conceal the timber and lessen its duration, which are subject to cracks and crevices

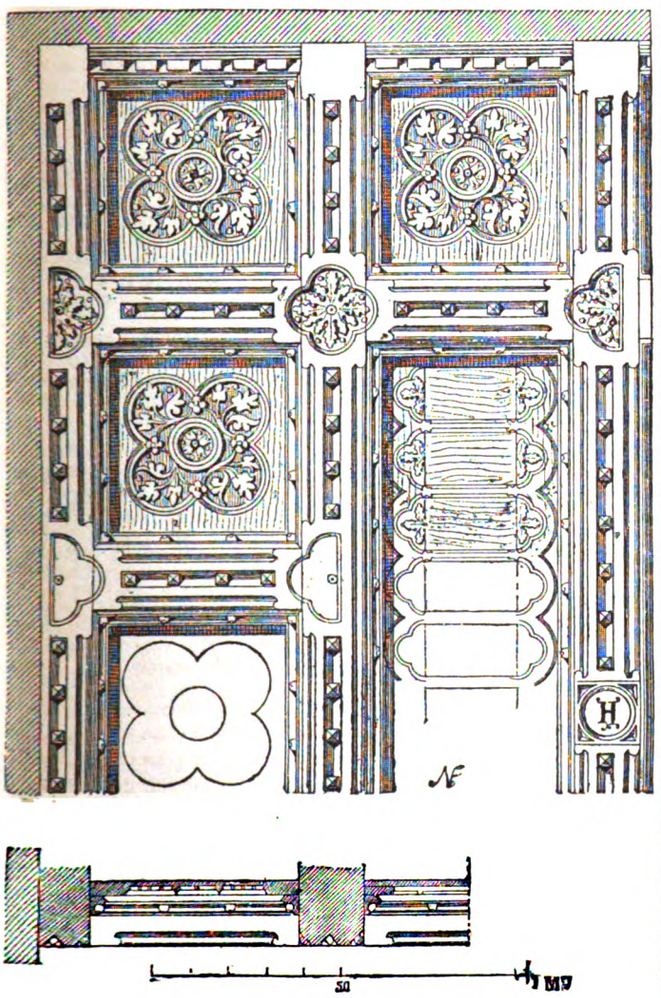

Fig. 127.

which cannot be avoided, and require continual attention and expensive repairs — they have constructed panelled ceilings, of which fig. 127 affords an example. These ceilings seem, at first, to remind one very strongly of those of the town hall at Augsburg, and the Presle mansion at Nuremberg. They are not therefore interesting in respect of originality, but of very ingenious adaption.

The ceilings of public buildings of the twelfth and thirteenth centuries consisted only of bare joists resting by each extremity on a wall, or if the distance was too great, on an intermediate beam. There were few or no openings in the walls to receive them, but corbels inserted in the masonry to support the ends of the beams. The edges were chamfered; the intervals and projecting parts were painted, and sparingly decorated. In the fourteenth and fifteenth centuries these primitive arrangements were transformed and enriched. The beams were placed so as to form panels and compartments ornamented with carving and painting; and at last the decoration assumed the principal feature, being distinct from the timber-work to which it was affixed, and thus ceasing to be an integral part of the structure.

[1] Printed by permission from the advance sheets of a Journey of an Architect in the North-west of Europe. Translated from the French by M. Felix Narjoux. James R. Osgood & Co., Publishers.

The ceiling represented in fig. 127 is, as we have said, copied from fourteenth-century models, and in reality presents only the lower face of the boards, thus showing plainly the nature of the construction which they embellish. In the ceiling the panelling is

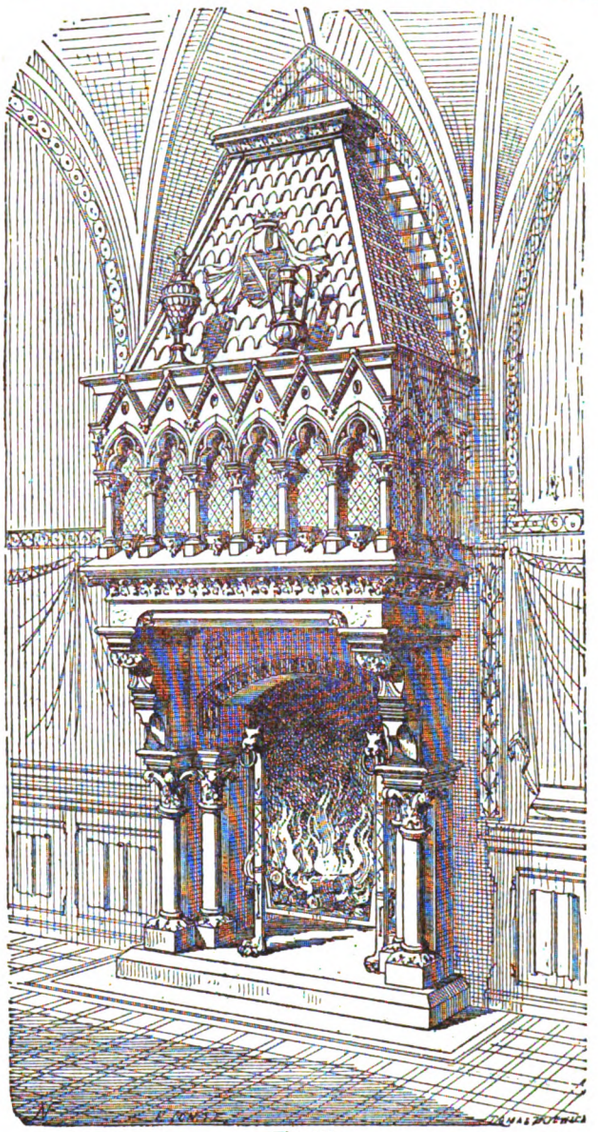

Fig. 128.

supported by furring nailed along each principal and cross beam. The carvings are in solid wood, and the groundwork of the panels rests on planks cut so as to give them the necessary projection; our sketches show the plan of construction. Above these large girders are joists of sufficient thickness to support the upper floor, and to fill up, in certain parts, the intervals between the beams.

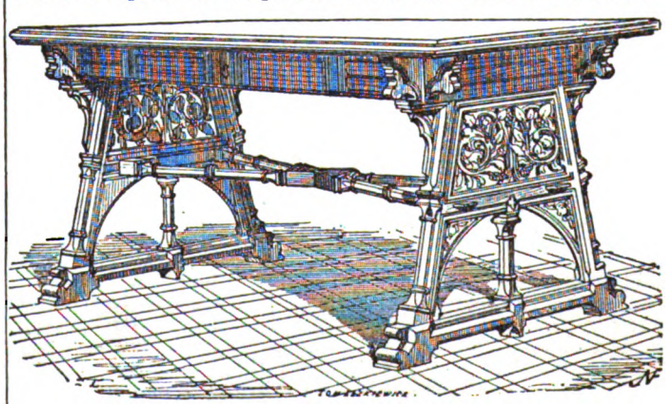

Fig. 129.

The height of the room in which these ceilings are placed is eighteen feet, which accounts for the outlines being so bold and the carvings so decided. As to the price of these ceilings, it is somewhat high, the square foot costing two and a half thalers.

The chimney-piece (fig. 128) stands in a large vaulted hall of octagonal form. It is made of white sandstone and polished serpent-

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ine. By means of a combination of colors which cannot be seen in our sketch, the union of stone and marble of different tints gives the colors of the armorial bearings of the proprietor, whose escutcheon is placed over the mantle-piece. The table (fig. 129) is intended to stand before a sofa in a drawing-room. The dimensions of its various parts may perhaps appear exaggerated when compared with those of our modern furniture; but on the other hand, they increase its firmness and durability. The legs spread out at the end, by means of an oblique arrangement, which gives greater support and steadiness to the upper part. The braces and crosspieces which connect the extremities are rather high, in

Fig. 136.

order to prevent persons placing their feet upon them; contact with which injures them so rapidly. This precaution may appear trivial; but it is the mark of a practical and thoughtful mind. This table in walnut-wood cost sixty-five thalers.

The chairs (figs. 136 and 138) are in oak or walnut; the arm-chairs, without the covers, cost fifty-two thalers. In order to avoid the usual manner of connecting the back of the chair and the hind legs, the designer (Mons. Oppler, the architect) has obtained the necessary inclination for the back, by causing the framework to go down to the middle of the hind legs, which are placed at a more oblique angle than those in front. This idea, which is very simple and ingenious, is also applied to the construction of common chairs, which are thus more steady than ours, the legs of which are united with the back at the level of the seat, and they are more comfortable than those with upright backs. The price of common chairs is two and a half thalers.

Fig. 138.

These articles resemble joiners' rather than cabinet-makers' work. They are really strongly made, and their construction is well-planned and executed. The wood is of fine quality, well cut according to the grain, with sharp and well-defined sides and edges. The joints are made with the greatest care, always fastened with wooden pegs, without any parts let into each other or nailed. There is no veneering or gluing: on the contrary, the mouldings and carvings are cut out of the solid wood; but there is often a deficiency of grace and elegance in the workmanship. The general effect is heavy, clumsy, and massive; and when they do not copy ancient models, there are often defects in the proportions.

NOTES AND CLIPPINGS.

THE HOTEL DE VILLE. — The walls of the first story of the new Hôtel de Ville at Paris, which are built of granite, are nearly finished. The upper portion, which is to be of sandstone, can be built more rapidly and at less expense, so that it is expected that the whole building will be nearly finished at the end of the year. The architects still hope to be able to preserve the vaulting of the Salle de St. Jean.

TESTING IRON. — The President has sent a message to Congress requesting that a small appropriation may be made for continuing the board for testing iron and steel. We trust so important a series of investigations may not be discontinued at this early date.

CHURCH AT SYRACUSE, N.Y. — On the 9th inst. was consecrated at Syracuse, N.Y., an Episcopal church, which was designed by Mr. White and built by Mr. John Nicholson. It consists of nave, transept, and an apsidal chancel, and has moreover a tower at one of the front corners some eighty feet high. It is built of dark slate-colored limestone relieved with a lighter stone; the interior, which is finished in chestnut, is covered by an open-timbered roof. Built into the exterior of the front wall is a piece of Canterbury Cathedral. The design of the church is Gothic of the Tudor period. The cost of the completed building is about $21,000.

NATURAL GAS. — There are now three gas-producing wells at Beaver Falls, Penn., one of which has been in operation over seventeen years. Two of the wells are nearly 1,100 feet in depth, one having been reamed out, and is said to produce about 100,000 feet per day, which is utilized in the cutlery works, except what is used in the gas-lighting works, where it supplies about sixty per cent of what is used. The other well is to be bored out to eight inches. The third well, recently bored, has struck a good vein of gas at 500 feet. This well is to be cased twelve inches, with a small tube inside to continue the boring to a greater depth, while the present product of gas, which is much greater than the other wells, can be utilized.

THE LONDON OPERA-HOUSE. — It is said that the £130,000 necessary to complete the National Opera-House on the Thames Embankment has been raised, and the works which have for some time been suspended will be resumed.

THE DOORS OF NOTRE DAME. — The *Academy* says that the doors of the Cathedral of Notre Dame, Paris, are to be replaced by new ones, as the old ones which it speaks of as "masterpieces of ancient sculpture" have fallen to pieces through age. We cannot make out what doors are intended, for our recollection of the doors upon the western front is, that they are plain oaken doors with most elaborate wrought-iron hinges, and that there is nothing in the woodwork deserving the name of sculpture.

ST. EUSTACHE, PARIS. — The repairs on the famous Renaissance church of St. Eustache are now nearly completed; besides the restoration of the main entrance and several minor restorations, the roof and campanile over the chapel of the Virgin, which were destroyed by fire in 1871 during the Commune, have been restored.

A GENEROUS MODEL. — M. Charles Alis Dubosc, a famous French model who died lately at the age of eighty-eight, left the following testament: "Having commenced to sit in 1804 at the age of seven, and having continued to serve as a model till seventy-two, I have thus passed my life with the most distinguished artists. I wish that after my death the little fortune I have gained with them should be consecrated to a foundation useful to artists. Consequently I name as universal legatee the Institute of France, Academy of Fine Arts, to dispose of my succession in the following manner: after the payment of all the expenses, what composes my succession in the three per cents shall be distributed each year in equal portions among the young painters and young sculptors received *en loge* for the *Grand Prix de Rome*, this sum to be remitted to them at the moment of their admission." The legacy amounts to about $40,000.

MEXICAN ONYX. — Specimens of Mexican onyx which we have received show us what a valuable material for interior decoration is being introduced by Mr. Manuel Fortuno. Those who visited the Centennial Exhibition will remember the attractive exhibit of this material in the Mexican department; notably a mantle-piece which we believe was purchased for one of the summer-residences of the Emperor William. The specimens have somewhat the appearance of a fine gypsum, but are manifestly of a finer and firmer texture. The specific gravity is said to be 2.90, and the hardness 4.50. It is a misnomer to call the stone onyx, which is really a species of agate composed of layers of chalcedony of different colors, whereas this is a translucent striated limestone similar in character to the onyx marble, which was first introduced by the French at the International Exhibition of 1862, and which is said to be a stalagmitic formation found in Algeria. The composition of the Mexican onyx is, lime, 55; magnesia, 1.25; water, oxides of iron and manganese, 0.10; carbonic acid, 42.40; sulphuric acid, 1.25.

PROCESS FOR DRYING THE ATMOSPHERE OF A ROOM. — In order to insure the complete dryness of the atmosphere of a room at Oxford, which is devoted to experiments upon electricity of high tension, an apparatus has been invented, which consists of a copper cylinder constantly heated by gas-jets, over which passes an endless band of flannel. The vapor which is driven out of the flannel is drawn off by the current of air that feeds the gas-jets. The flannel, dried by contact with the heated cylinder, passes through the room, and in its cool state collects whatever moisture there is in the room.

A ROLL OF PAPYRUS. — It is said that some twenty years ago a Mr. A. C. Harris went with his daughter, Miss Selima Harris, on a tour to Egypt. He found under the floor of an old tomb in Thebes a large roll of papyrus, covered with inscriptions. It was one hundred and thirty-nine feet long by sixteen and one-half inches broad, and looked something like a stair-carpet. After his death Miss Harris sold it to the British Museum for a large sum. It proved to be a complete record of the life and works of Rameses III., containing a statement of the condition of things at Thebes three thousand years ago.

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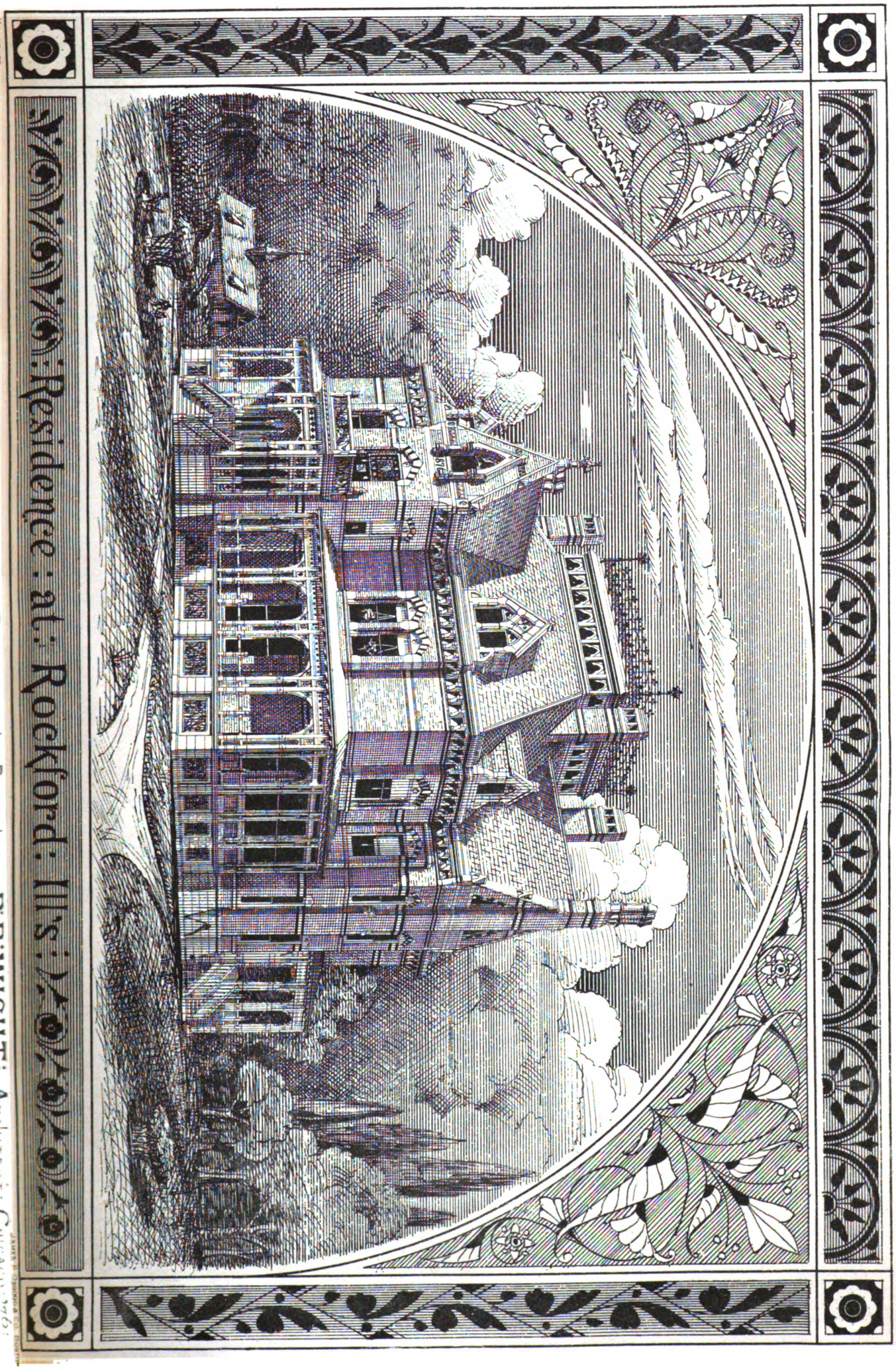

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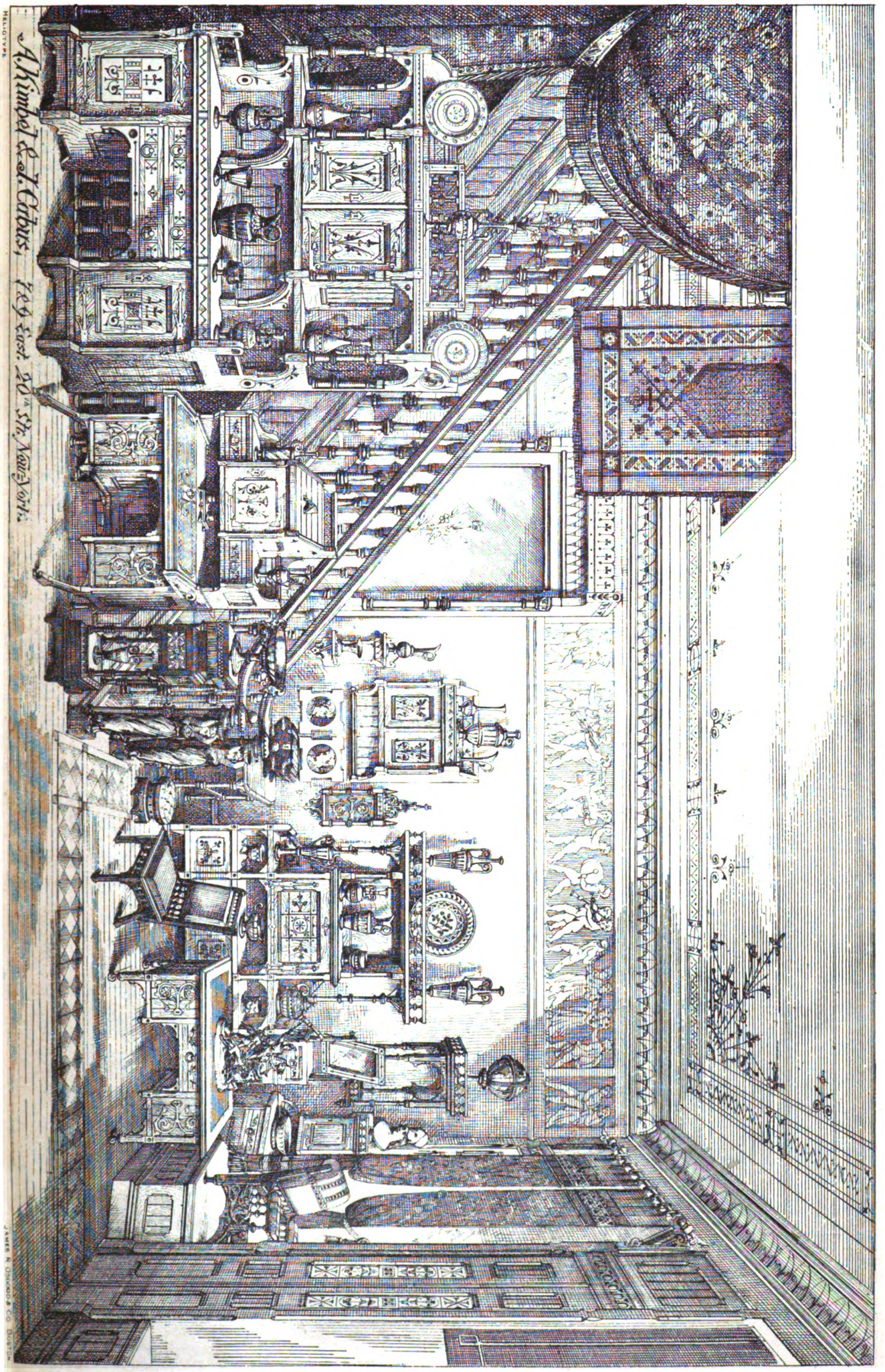

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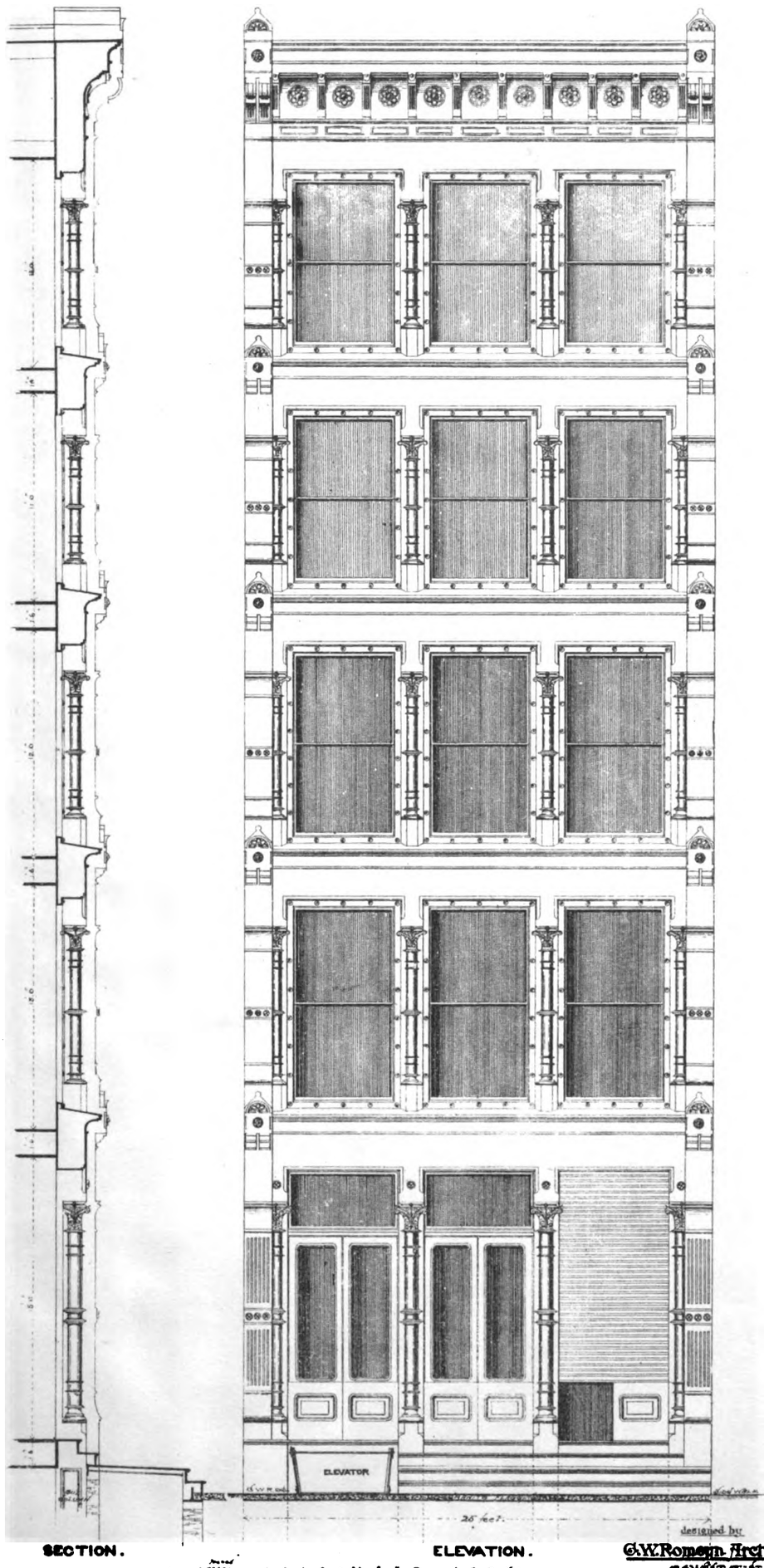
Iron Façade



SECTION. ELEVATION.

designed by
G.W. Romeyn Architect.
31 West St. N.Y.

HELIOTYPE
JAMES R. OSGOOD & CO. BOSTON

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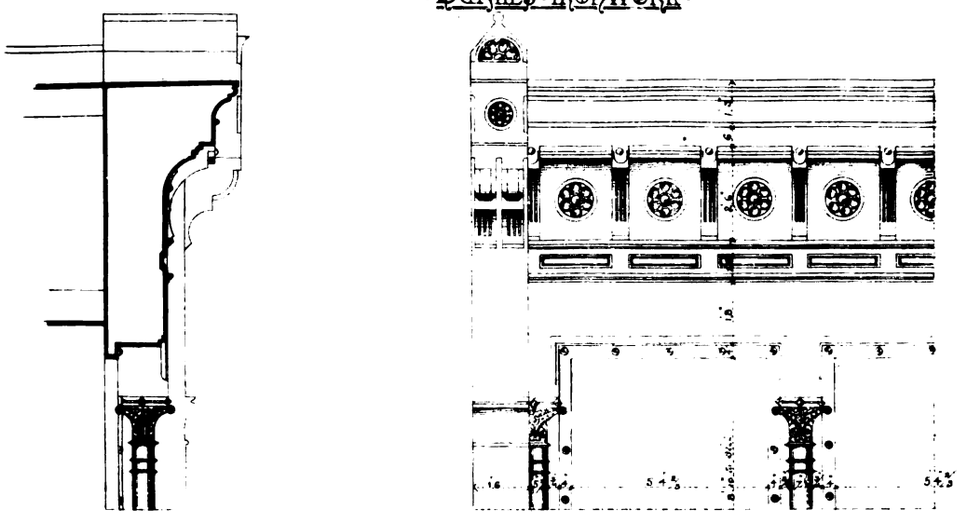
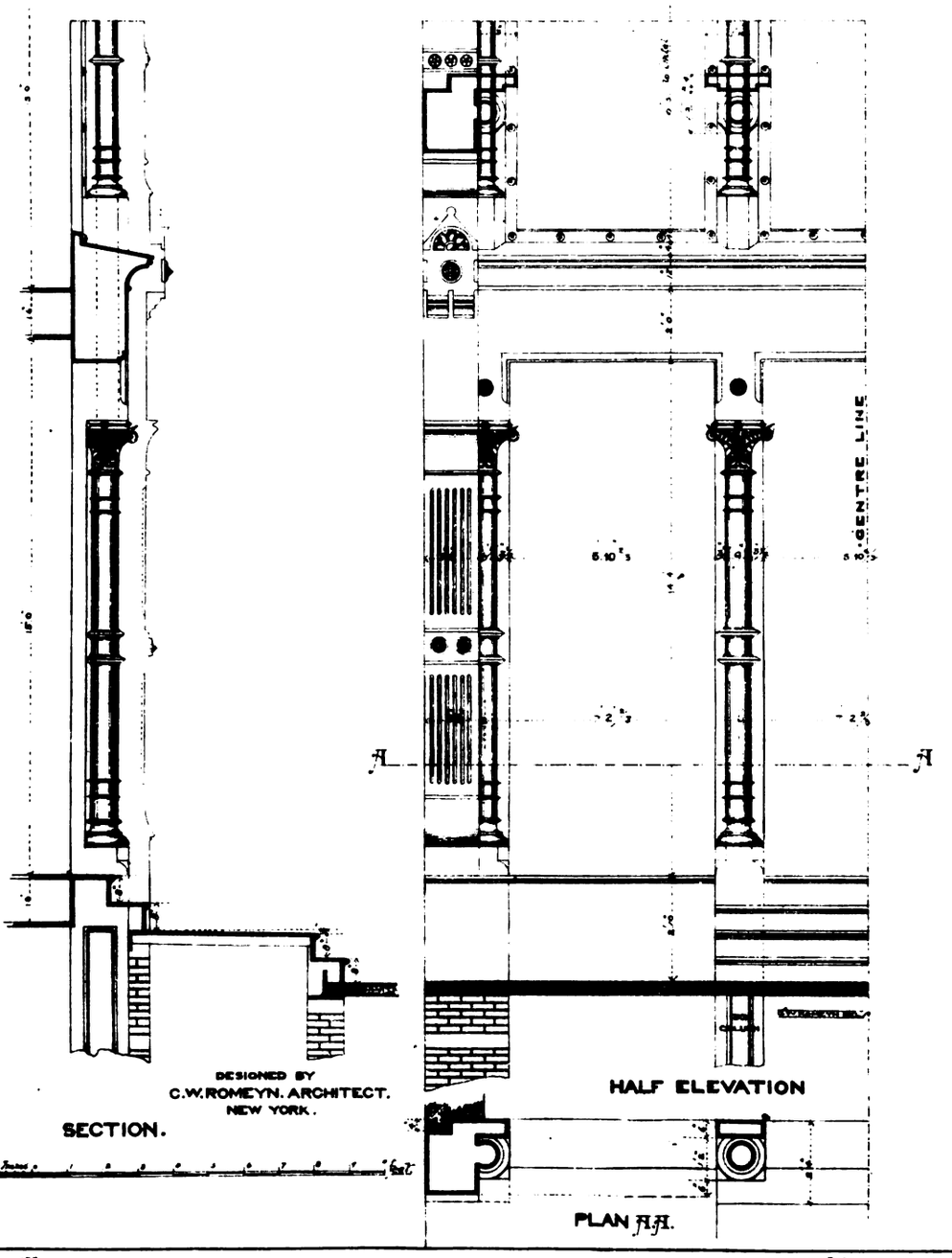
STORE N° 31 GREENE ST. N.Y.

DETAILS · IRONWORK



HALF ELEVATION AND SECTION OF CORNICE.



DESIGNED BY
C.W. ROMEYN. ARCHITECT.
NEW YORK.

SECTION.

HALF ELEVATION

PLAN A.A.

JAMES R. OSGOOD & CO. BOSTON

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. II.] Copyright, 1876, JAMES R. OSGOOD & Co. [NO. 62.

BOSTON, MARCH 3, 1877.

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To a civilized and populous country, few public undertakings are more important than thorough surveys. When land is abundant and comparatively valueless, communications and improvements few and rude, a rough determination of boundaries is sufficient. But when population increases, land grows dear, and communications complicated, the want of accurate surveys is a very serious evil. It is beginning to be felt so in the United States, where there is no single State that has yet made a thorough survey, or provided itself with trustworthy maps. Some forty years ago Massachusetts undertook a State survey, and under Simeon Boyden a triangulation was laid out, and the topography determined to a good degree. The work is believed to have been done with great accuracy; but the contouring, a vital point for the usefulness of any survey, was omitted. Very recently an effort was made in the Legislature to have a contour survey undertaken; but, important as the matter was, the bill for it did not pass. Now also New Jersey, Pennsylvania, and some of the Western States have thorough surveys on hand, but many have no surveys at all. The General Government has, by its coast survey, determined with unexcelled precision the contouring and topography of a narrow strip along the coast, and fixed a series of triangulation points which give the best possible basis for extended surveys; but few of the States take advantage of it, and none of them have any accurate knowledge of their surface. This condition of things is a source of endless inconvenience and expense. No other civilized nation has been willing to endure it. It is not intolerable to us, only because we do not know what it is to be free from it. Wherever a railroad is to be planned, a canal or a high-road located, wherever a town is to be supplied with water, or a dam built or an aqueduct carried, almost wherever a mill is to be built, the whole work of determining levels and testing lines has to be done by local surveys from the very beginning, almost as if it were in a wilderness. These surveys thus undertaken for isolated enterprises do not help each other, and leave no legacy to those that follow. Starting from points that have never been properly determined, carried out often hastily and imperfectly, they are not much to be trusted in themselves; and if they are in any way connected, an error in one vitiates the whole. Whenever a new project comes up, the work is undertaken *de novo*. Old town and county boundaries run out with chain and compass are vague and uncertain, landmarks are removed, and endless uncertainty and litigation follow.

WE are reminded of these things by receiving a copy of the report of the Board of Commissioners of the New York State Survey. An act was passed in April, 1876, appointing a board of commissioners, and appropriating twenty thousand dollars to make "an accurate trigonometrical and topographical survey of the State," and to establish points and lines for the guidance of local surveyors in connection with the triangulation points already established by the United States Coast Survey. The commission set to work to examine the existing maps and surveys of the State, and appointed Mr. James T. Gardner, who had been for a long time in charge of the United States Geological Surveys in the West, the director of the survey, with instructions to report a plan for carrying it on, and an estimate of its cost. They found, as might be expected, that the existing maps were grossly inaccurate. The towns of Buffalo, Elmira, and Plattsburg, for instance, were laid down three miles from their real positions, on the best maps that were to be had. In the surveys of Lake Champlain, errors of three miles in twenty were found, the work not having been done since the Revolution. The old surveys had been hastily made with compass, without taking note of the magnetic variation, and with inaccurate chains, and in most cases the landmarks had disappeared. Of the configuration of the surface nothing was determined. The director in his preliminary report included in that of the commission, mentions two cases in which the boundaries of the corners of counties had been lost. The New York Central Railroad, uncertain where one town ends and another begins, is sometimes called on by two towns for taxes on the same piece of track. The report sets forth with emphasis one of the special inconveniences which the people suffer for want of knowledge of the country. Many persons, it says, have lost their money in valueless and impracticable railroads when if the maps "had shown the relative heights and positions of hills and valleys, and the natural channels of commerce, they could not have been induced to invest their money in projects so placed that failure was inevitable." In some instances roads have been carried over hills at ruinous cost, where valleys might have been followed at comparatively small expense and with larger traffic.

THE report of the director, Mr. Gardner, gives an account of what has been done thus far in the work. The very accurately determined stations of the coast survey along the Hudson, and the measured base-line on Fire Island, serve as starting-points; and a series of well-conditioned preliminary triangles has already been established across the central counties of the State, from the Hudson as far west as Cayuga Lake. His plan proposes fixing a system of triangulation points at distances of a dozen miles or so apart all over the surface, which from their mutual connection can never be lost, and filling in the topography between these as minutely as may be thought desirable. The twenty thousend dollars appropriated is of course insufficient for such work. He estimates that such a survey, as detailed as he considers necessary, can be carried over the forty thousand square miles which require it for two hundred thousand dollars, and he proposes that those towns which desire particularly minute topographical work be required to share the local expense with the State government, as has been done elsewhere. The commission therefore recommend that an annual appropriation of twenty thousand dollars be made for ten years. Considerable opposition is made at Albany to the commissioners' scheme, we are told. We sincerely hope for the credit and profit of New York, and for the example to other States, that the thing will be done, and well done. It will cost something, to be sure, — as much as providing a post-office for a considerable town, or building a dozen miles of railroad. But to do without it will be found much more expensive, and the cost as well as the inconvenience of putting it off will increase steadily, while to do it imperfectly will be saving at the spigot and wasting at the bung.

IT is almost with a feeling of relief that we hear of the comparatively harmless burning of Fox's Theatre in Philadelphia. Comparatively harmless we must call it, although two or three of the adjoining buildings were set on fire by it, including the Mercantile Library, and three men were severely injured, one fatally perhaps, by the falling of one of these buildings. For the situation and arrangement of the theatre were such, if we are to believe the Philadelphia inspectors of buildings, that if the fire had occurred during

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a performance, it is almost certain that there would have been terrible loss of life among the audience. It was set back from the street and surrounded by other buildings, and had for the only exit of the three thousand spectators which it would seat, or the five thousand which it professed to "accommodate," a single corridor fifty-two feet long and thirteen and a half wide, which was further reduced, as we understand the report, by having a staircase in it (see *American Architect* No. 58, Feb. 3, 1877), to say nothing of the fact that more than a thousand people were expected to descend from the third tier by a single staircase four and a half feet wide, discharging into the lobby of the second tier. It hardly needed the Brooklyn fire to remind us of the swiftness with which fire spreads in a theatre, a swiftness so proverbial that Fölsch says in his treatise on theatre fires, of which we have already given Mr. Nelson's abstract (*American Architect*, No. 57, Jan. 27, 1877): "To extinguish a theatre which is already on fire is so hopeless, that in the words of a skilful fire-engineer, it is actually a pity to use a drop of water in such a case except for the protection of the neighboring buildings." This is the third theatre that has been burned at the East within a few weeks. In ten minutes after the fire was known the adjoining houses were on fire. The theatre-goers of Philadelphia have cause to congratulate themselves on their escape.

IT would seem as if the famous Mr. Ayrton, First Commissioner of Public Works in the late liberal cabinet of England, had been a more representative man than people liked to believe, or else that the lesson of his influence had penetrated far enough into the government to outlast a change of ministry, and influence the feelings of his successors. At least the fondness for snubbing architects seems to have survived him; and if we may trust the accounts of the English papers, our profession is no more in favor with the government than it was in his day. The last example of conspicuous neglect is in making up the commission on the coming French Exhibition, on which no architect is appointed, although a reasonable consideration for the dignity of the Royal Institute of British Architects would have dictated the appointment of its president or one of its prominent members. The slight was sufficiently felt to bring up a proposition for remonstrance at the last meeting of the Institute. It is possible that the mass of Englishmen regard an architect as an ornamental rather than a useful appliance in building. Whether this view, which certainly is natural to what Mr. Matthew Arnold would call the Philister element in society, is gaining prevalence, or whether it is merely coming more into relief by contrast as the profession is growing in real importance, we cannot judge. In our own country it is decidedly waning; and it would be a matter of surprise if among us a man of Mr. Huxley's eminence should give in public the foolish advice which that gentleman gave at Baltimore. Very possibly the facts that in our country the habits of life and therefore the plans and appliances of our houses are in process of development, while in England they are comparatively fixed, and that experience has shown that architects are the only persons who can really devise the means of adapting our houses to our new and growing wants, have something to do with the greater dependence on the profession which our people are beginning to feel, — if it is greater than in England, — for the building of a man's house is a thing that touches him nearly, and to suit him in it is to find a short road to his favor. It is some offset to the slight to the profession, that the House of Commons lately in authorizing the laying out of an important new thoroughfare in London, has coupled its authorization with the condition that the Metropolitan Board of Works shall consult the Council of the Institute in reference to the best way of doing it. To make a really successful use of this condition, would no doubt add to the consideration of the Institute; but if we may believe what we read, the enforcing of criticism upon the Board of Works is apt to be a ticklish business.

IN our last number we mentioned the trouble that had arisen over the obelisk, the companion to Cleopatra's Needle, which, presented to the British Government by Mehemet Ali, has been left lying in the sand at Alexandria for nearly half a century. It appears that in the present exigency a wealthy physician of London, Dr. Erasmus Wilson, has undertaken to bring it to London at his own expense. Mr. Dickson, C. E., has devised for conveying it, not inappropriately, a kind of mummy-case or shell of boiler-plate, into which the obelisk is to be built, — a perfectly tight hull decked over closely and provided with a keel to steady it. This need not be very large, — the obelisk being about seventy feet long, and probably, like all others, a tenth of its length in diameter at the base, — and could be towed home by a steamer to the very edge of the Thames Embankment where it is proposed to set up the monument. In case of violent storm the barge may be cut adrift with the expectation of finding it again, which, since it is not likely to founder, might not be difficult. Nevertheless it is to be hoped that it would not be found necessary to abandon it, for a collision with it, which might occur in a dark night, would be disastrous. The cost of the undertaking we have seen variously estimated in different English papers at from ten to eighty thousand pounds. We do not see why it need greatly exceed the smaller sum, unless the building of an iron hull at Alexandria is very costly.

AT last advices more than fifteen thousand exhibitors had already enrolled themselves for the French Exhibition. It is expected that the whole number will not be less than twenty-five thousand, or a fourth more than at the exhibition of 1867, and this notwithstanding the refusal of Germany to take part. A surface of 3,430 square metres (upwards of thirty thousand square feet) in the building on the Champ de Mars has been set apart for the fine-arts department. It is on the left of the great southern entrance on the *Avenue de la Mothe-Piquet*. North of the river two thousand workmen are working by day and night, helped by electric light, and urging forward the excavations and the foundations for the palace on the Trocadéro. The honeycombed condition of the hill (see *American Architect* No. 48, Nov. 25, 1876) has made the preparation of the substructures very difficult. Enormous piers and arches are building under ground to support the weight for which the strength of the perforated rock is inadequate. It is said that forty thousand cubic yards of subterranean masonry will be required for the purpose. This work is carried on, it may be remembered, through a tunnel which has been driven into the hill from the level of the quay at its base, and is quite independent of the work on the immediate foundations of the building, which are laid in the upper stratum of the hill overhead. The building is to be occupied by an historical collection to illustrate the "History of Labor," in which as great an accumulation as possible of the curious and decorative work of past ages will be assembled. Every acknowledged nation, it is said, except Germany and Morocco, has given notice of its intention to exhibit.

THE commission which was appointed by the French Senate last August to determine what steps should be taken towards either restoring or removing the Palace of the Tuileries has considered the report of its sub-committee of investigation on which we commented not long since (see *American Architect* for Dec. 16, 1876), and has unanimously requested the Minister of Public Works to carry out the suggestions contained in its report. As has been generally expected, the commission recommends the preservation of that portion of the palace which was designed by Philibert Delorme and Jean Bullant, — that is, the central pavilion and the wings which distinctly belong to it. These portions are still in great part standing, though much mutilated by fire. Besides the parts due to these masters, the commission recommends that the alterations of the central pavilion which were made in the reign of Louis XIV by the elder Mansard be preserved, as by so doing the group may escape being overawed by the pavilions of Flora and of Marsan on either hand; but we fear that this will not have the desired effect. It is recommended that the exterior walls and such of the partitions as are necessary for the solidity of the building should be renewed; that the roof be so restored as to best answer the necessities of the building, for it is proposed that the palace shall be used as an art-museum, the exact nature of which shall be hereafter determined; that the walls

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formerly rising above the porticos be suppressed; that a lateral façade be built at the end of each of the side pavilions; that the terraces be reconstructed; and that the group be surrounded by a regular garden. All restorations and alterations should be made, says the commission, "in the spirit of the original work," of which there are ample indications in the ruins and in photographs, prints, and drawings; or even if these should be unsatisfactory, there is ample material of the same date elsewhere in France for replacing satisfactorily such distinctive features as the sculptures of the attic. The commission also expresses the hope that such activity may be exercised in restoration, that it may be completed by the 1st of May, 1878; which means, in time for the Exposition of that year. M. Charles Blanc has written a letter to *Le Temps*, vigorously opposing the project of restoration, and saying practically that there is nothing to restore, — that there is nothing left of the work of Philibert Delorme; neither his plan, which was violated; nor his elevations, which have been built upon; nor his elegant cupola, replaced by a chunky dome; nor his charming porticos, which have been blocked up; nor his terraces, which have disappeared, — all of which is true in one sense, and untrue in another. Meanwhile the question goes before the Senate, where, it is rumored, political feeling will not be left out of the discussion.

KNIGHT'S MECHANICAL DICTIONARY.[1]

THE title-page of this book indicates with old-fashioned fulness what its scope and purpose are. It aims at giving a digest of the whole range of mechanical invention, including machinery, manufacturing implements, tools of trades, scientific apparatus, domestic appliances, processes of workmanship, and technical terms, — to be, in fact, a complete technological dictionary. It is not a dictionary of mechanics, but of mechanical appliances, and these viewed from their mechanical rather than their scientific side. The principles and facts of science are touched upon only as they are illustrated in the machines and processes which are described. The plan of the book differs from that of any on the same subject that we have seen, in that it is purely synoptical, depending on alphabetical, not topical, arrangement; and subdividing every process as far as possible. Thus in respect to cotton manufacture, for instance, no continuous description of the whole process is given, but every separate machine and appliance is given in its own alphabetical order, and whoever wishes to follow out the whole manufacture will do it by consulting successively the various articles in which the tools and machines that belong to it are described. The object has been to make the book as apt as possible for immediate reference, and to enable the reader to find as quickly as may be the particular fact or appliance he is in search of. The system of subdivision has been carried so far that there are in the three volumes, we are told, some twenty thousand articles. They cover an enormous range of subject; some of course are very brief, others are treated at considerable length; together they fill more than twenty-eight hundred double-column quarto pages.

To facilitate the examination of subjects which include a variety of processes or implements, the author has devised a system of special indexes. He has gathered all the words which belong to a particular trade, manufacture, or art, into an index under the heading which best characterizes it; and a list of these indexes is given at the beginning of the work. There are about one hundred and sixty of them, and they include some fifteen hundred words. Each term in the body of the work which is comprised in one of them carries a reference which directs the examiner to the index, and thereby to all the others of the same category. It can have been no easy matter to arrange such a mass of detail systematically under so extended a classification. It seems to have been done on the whole with excellent judgment, though any classification so comprehensive must be in danger of seeming arbitrary in parts. The thing however is very methodically handled, and the reader seldom has difficulty in finding under what head any desired information is to be found. The labor which he has in following any extended subject through a great many scattered particulars is not small, even with the aid of the best of indexes; but this disadvantage is inseparable from the form of a dictionary, and is offset by the facilities for turning at once to the needed fact, which it is the purpose of a work in such a form to supply. The dictionary before us is a distinctively American one; its material has been in a large degree gathered from first sources, and a great deal of it has not yet been collected in any similar publication. The occupation of the author, who was for a long time busied with the classification of patents in the Patent Office at Washington, gave him an unusual opportunity to become familiar with the whole field of American invention; and it was there that he began to collect the material that grew into this work, which therefore probably contains the best digest that has ever been made in a form for popular use, of the inventions of our countrymen. It is by no means confined, however, to American mechanism: the important inventions of foreign countries, and indeed the history of inventions from the earliest times, occupy a good deal of space in it. It is unfortunate for the purposes of any dictionary that the terminology of the trades in America is so confused as it is, that such different terms are used in different places for the same things, or the same term in so many different ways. For this reason if for no other, only comparative completeness is possible in recording such terms. But an exhaustive technological dictionary is of course an impossible thing; and it is only a matter of individual judgment where the work of compilation shall stop. The present work contains an amount of detail that is astonishing, — as much probably as could well be included in any work of manageable bulk, and more than could be made accessible by any less methodical arrangement.

The greater part of the book is taken up, as would be expected, with machines and mechanical inventions; and excellent judgment seems to have been used in the selection of examples. We have seen very few valueless inventions introduced; and almost every important one that we have thought to look for is there. The descriptions are admirably clear, precise, and straightforward, and show a remarkable faculty of condensed statement. Many of the articles amount to comprehensive essays on the subjects they describe; we may instance that upon fire-arms, — under which are given descriptions and illustrations of no less than twenty-four of the most approved forms of breech-loader, a classified list of several hundred patents bearing on the subject, and a sub-index of more than fifty articles relating to it, which are found in their proper places, — or the articles on telegraph and telephone, which, appearing in the third volume, published last, show that pains has been taken as the work proceeded to bring into it the latest information that was available.

In regard to architecture as architecture, there is very little information given in the book, which in pursuance of its plan limits itself to construction; and the little that is given is neither very important nor very accurate, being evidently compiled without special study. In such matters of scientific theory as are touched upon, too, we notice here and there a weak point, or one which is not up to the standard of the day. But these examples do not give a fair idea of the quality of the work. In what is the essential part of its matter, the practical applications of mechanism and invention it is, so far as our examination has been able to test it, remarkably full, and we should say, exact. Under the head of metal-working, we have an index which refers us to more than three hundred implements and processes which are described in the book. Under civil engineering are given nearly three hundred examples; under carpentry and masonry each about three hundred and fifty; under surgical instruments five hundred and upwards; domestic appliances, one hundred and eighty, — and so on. The wood-cuts with which these articles are illustrated, some seventy-five hundred in number, are of the best, excellently engraved, and chosen with great judgment to give a clear presentation of their subjects without excess of detail. There is also scattered through the book by way of illustration a good share of historical and even literary information, which will considerably enliven it for the general reader.

We have already in the short time that this book has been on our table had occasion to consult it many times, to our

[1] Knight's American Mechanical Dictionary: A Description of Tools, Instruments, Machines, Processes, and Engineering; History of Inventions; General Technological Vocabulary and Digest of Mechanical Appliances in Science and the Arts. By Edward H. Knight, Civil and Mechanical Engineer, etc. Illustrated with upwards of six thousand engravings. New York: Hurd and Houghton. Cambridge: the Riverside Press.

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profit. We commend it to the student of specific machines, who will find the chief features of his subject well indexed in it for his reference; and to the general reader, to whom it will be a mine of information of a very serviceable kind and in a most accessible form.

THE ILLUSTRATIONS.

THE HOPE PUMPING-STATION PROVIDENCE, R.I., WATER-WORKS. MR. ALFRED STONE, ARCHITECT.

(No. 65 Westminster Street, Providence, R.I.)

THE engine-house and boiler-room represented in our issue of to-day was built in 1872–3 for the high level service of the city of Providence, R.I. The building is situated in a thickly settled portion of the city, requiring more than ordinary care that it should not by its architecture detract from the value of the surrounding property. It was required to be a fire-proof building. It is built of Danvers pressed bricks laid in black mortar, with underpinning of the reddish Westerly granite; and belts, arch-stones, cornice, and front porch, of Concord and Quincy granites. The shafts of the columns in the front porch and in the mullions of the windows are of polished red and dark Quincy granite with carved capitals of Concord granite. The roofs are of iron frame with two thicknesses of corrugated iron lath with an air-space between, the plastering being applied to the inner and the slates laid upon the outer sheets. The engine-room is ninety-six feet six inches extreme length, forty-five feet wide, and thirty-five feet high. It has a wainscot of black walnut seven feet high, and the floor is laid in black and white marble tiles with granite steps leading to the boiler-room. The engine-room now contains two engines for pumping water directly into the high service pipes under the requisite pressure. The boiler-room is forty feet long, twenty-six feet wide, and twenty-seven feet high, with coal-vaults in the rear of the room, and extending into the embankment of the reservoir; the coal is dumped into the vaults from the roadway, which, as well as the embankment of the reservoir, can be seen in our illustration.

DETAILS OF THE NEW YORK MUTUAL LIFE-INSURANCE BUILDING, BOSTON, MASS. MESSRS. PEABODY AND STEARNS, ARCHITECTS.

(60 Devonshire Street, Boston, Mass.)

ACCEPTED DESIGN FOR THE TOWN LIBRARY, WOBURN, MASS. MESSRS. GAMBRILL AND RICHARDSON, ARCHITECTS.

(57 Broadway, New York, N.Y.)

CORRESPONDENCE.

THE CONTRACTS FOR THE ILLINOIS STATE-HOUSE. — THE CHICAGO GOVERNMENT BUILDING. — THE COOK COUNTY COURT-HOUSE.

CHICAGO.

A PECULIAR feature in connection with the erection of our new State House was the way in which the stonework was done. This is a subject causing much discussion now that it is too late to correct mistakes, and is being "ventilated" by one of our daily papers. But there is no prospect that any one will be seriously hurt by this process; and it will be found after all the facts are out that the State, through the stupidity and inconsistency of its Legislature, has shown great weakness in the manner of transacting its own business.

An act of the Legislature approved in March, 1869, provided that all the work which could be done on the new State House by convict labor should be performed at the State Penitentiary at Joliet. The Legislative Joint Committee appointed in April of the same year, with power to authorize the commissioners to proceed with the erection of the building, provided the estimates should be satisfactory, appear from the reports to have given such authorization in August or September following. The foundation had already been completed; and it was now time to begin with the stonework, the only kind of labor that could be performed by convicts under the State law. By what arrangement this part of the work was done from this time to Aug. 9, 1872, does not appear from the report just issued; whether by the Penitentiary Commissioners or by contractors for the convict labor, I have no means now of ascertaining. But in 1872 the Penitentiary Commissioners advertised for proposals for the labor of two hundred and twenty-five convict stone-cutters, as provided by law. With the State House under way, and an existing law requiring the work to be done at the Penitentiary, it was evident that the successful competitor of the convict labor would be the contractor for the State House. This made the competition a lively one. The contract was let to the highest bidder, W. D. Richardson of Springfield, at eighty-one and one-third cents per day per man, and the contract was signed Aug. 1, 1872. A clause in the contract provided that he should do the cut stone work for the new State House, "upon the request" of the Penitentiary Commissioners, "subject to the conditions as to the duties of the respective parties and modes of fixing the price of said stone when furnished, contained and specified in and by the act of General Assembly, entitled," etc. (specifying the act of 1869). Only eight days after this, on the 9th of August, the Penitentiary Commissioners addressed to the State-House Commissioners a definite proposition to furnish the cut-stone work in accordance with the law; and this was the only contract ever entered into. Richardson was no party to this agreement, but became a sub-contractor by his contract of the 1st, to do the whole work. The records of the Penitentiary Commissioners and the minutes of the investigating committee of 1875 show that there was an agreement and perfect understanding between Richardson acting for the Penitentiary Commissioners, and the State-House Commissioners, as to the scale of prices to be paid for all the cut stone finished and delivered at Joliet, which also had the sanction of the architects; that the vouchers were to be issued to the Penitentiary Commissioners and by them indorsed over to Richardson, who was to draw the money and pay back his labor bills to the Penitentiary. This arrangement was carried out until June, 1876, when Richardson's contract with the Penitentiary Commissioners was cancelled by mutual agreement. The contract was for five years, and should have extended to Aug. 1, 1877. A series of complicated transactions between Richardson and the Penitentiary commissioners, too extensive to be now rehearsed, preceded this apparently sudden breaking of the contract and consequent settlement. Richardson, though not having completed the stonework, had done all that the State-House Commissioners wanted him to do or had money to pay for. The Chicago *Tribune* is now making capital, in its warfare upon the two commissioners, out of all these circumstances. The case looks pretty bad for the Penitentiary Commissioners, who were in a great hurry to let out the labor under their control, when the statute required that they should use it on the State-House. When they did this the State was put at the mercy of the contractor, for competition was out of the question, and there was a door open for a conspiracy between the contractor and the Penitentiary Commissioners. The State-House Commissioners were helpless. The prices had to be fixed without competition, and Richardson took all the profits. The cause of the whole fault was with the Legislature which required the State House to be built by convict labor, and allowed that labor to be let by contract. The complication was such as probably never before occurred in any building-operation.

The next public building in importance, of the three mentioned in my last, is the Chicago Custom House and Post-Office. The history of this has heretofore been given in this correspondence. With the close of the building season last fall the walls had been levelled up all around to the top line of the main cornice, and are now ready for the dormer windows and *bahut* which connect them in some places, as designed by Mr. Potter. The stonework for nearly all this has been cut this winter, but lately Mr. Hill has made another change in the design. The drawings for this have just been received by the superintendent here. From an artistic point of view the changes cannot be considered an improvement. Potter's design showed the steep roof coming down to the cornice between the dormers in many places, while the *bahut* was introduced at the angles and centres of the long fronts. The irregularity in the lower line of the roof destroyed the usefulness of much of the attic story. Mr. Hill has tried to restore this by carrying the *bahut* all around and increasing the height of the windows, allowing only the gables above the dormers to show above the bottom line of the roof. He has made an effort, too, to preserve most of the stone which has been cut. But his change in the details is by no means an improvement, and on the corner pavilions he has pushed the dormer windows bodily up above this additional story, where they will have nothing to light. Had he simply filled in the *bahut* all around, and introduced dormers of stone on the curtain walls where Potter had small roof-windows only, it would have been a decided improvement in the direction of both use and beauty. The changes have some tendency toward a restoration of the original Mullett design; and in this the influence of Mr. Mullett, who is now a roving superintendent for all the buildings designed by him when Supervising Architect, is plainly perceptible.

There is no evidence yet of those terrible catastrophes which the first examining commission considered inevitable, notwithstanding that nothing has been done to those terribly berated foundations.

The New Cook County Court House is *in statu quo*. The foundations of the county's half, and the cellar story up to grade, have been completed for some months. They look solid and well built. The whole is built on heavy piling. All the piles for the dome are driven, and they cover the whole area of ground included in it. The city being bankrupt is powerless to proceed with its half. The county has its half under contract to the roof line for a little less than a million dollars; no contracts having been made for the dome. The county treasury is now without funds, and the courts have decided that it has no power to contract a loan without a popular vote. No more money will be available therefore until the taxes are collected, which if paid promptly will yield sufficient for all the work that can be done this year. It remains to be seen whether the contractors will go on with the work or not, under the present circumstances.

The design of the exterior is in the Renaissance style, a little less elaborate though not quite so heavy as that of the Philadelphia

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City Buildings, and is fully equal to the latter in artistic merit. It is a sign of progress that the inevitable mansard roof has been discarded.

The drawings are still only in outline. The architect, Mr. J. J. Egan, has had so much labor in making the changes last decided upon and getting the foundations properly built, that he has been unable to prepare a perspective view of the building. Mr. Egan is already beginning to experience serious trouble with his clients in this connection, which is not to be wondered at when the notorious character of our County Board is taken into account. He is working under a very strong written contract with the county, prepared by its attorney. But while the commissioners thought it was a very good one for their side, it proves to be equally good for his. The contract provided that he should work according to the design originally adopted; and his compensation was fixed at three per cent on a specific sum, the estimated cost of the county's half of the building. After he had prepared all the drawings and specifications for this design, and been paid half of the commission according to the contract, the whole design was changed after the conferences with the city authorities, which I described some time ago. The original design was set aside, a new set of plans made, and the foundation of the county's half laid according to them. The new design is more expensive by a million dollars than the old one, and has also been adopted by the City Government, though no contract has been made with Mr. Egan for his services in connection with that half of the work. The change in design necessitated an increased cost in the foundations which were already under contract. The contractor has made a claim for extras which the architect refuses to allow, as it is about three times as much as he considers it worth. The commissioners cannot pay the bill without Mr. Egan's certificate unless they override him by a resolution of the Board, which they have not yet done. Unwilling to shoulder this responsibility through fear of the vengeance of popular opinion, they have been endeavoring to make him shoulder the responsibility by certifying the bill. But they have found that he is not the pliant tool they took him for. The whole thing came out the other day when Mr. Egan asked the Board for an appropriation for his services in making the new design, which they flatly refused. But one member was so indiscreet as to say that he would never vote for another cent to Egan if he did not certify Harms's bill for the foundations. The whole thing is equivalent to blackmail. They do not want Egan's money if he will only help them to fix it up with the contractors. He has taken a firm stand and will not yield.

The tactics followed by the ring of the County Board are only such as they have learned from the methods that have been practised by unprincipled architects. The only difference is that they want the commissions themselves, and want the architect to certify the bills and shoulder the responsibility. The penalty for refusal is a stoppage of his legitimate fees. This same ring commenced long ago by demanding a part of his fees, but that would not work. Their trusted agent, as appeared from an investigation by the grand jury, had demanded five thousand dollars out of the seven thousand dollars which was first appropriated for the architect's fees. But the attempt to procure money in this way was unsuccessful.

THE IMPERIAL MUSEUM IN LONDON.

LONDON.

IT will be a somewhat striking proof of the dearth of accurate information concerning the *technique* of the arts, even in England, where the canons of good taste are very widely received and appreciated, to mention that in discussing the demerits of the "old china craze," which is now surely declining, a respectable first-class review stated that when an artist applies his colors to some object of ceramic art, he knows absolutely nothing of the changes firing will effect, and that the beauties of the piece are dependent wholly on the uncertain action of heat. No intimate acquaintance with the process of decorating pottery is needed to dispel this vagrant fallacy. The habit of exercise of the faculty of logical analysis is amply sufficient for the purpose; since, were the notion based upon even obscurely recognized facts, the impracticability of exactly reproducing some lost or defective piece, or of originally producing a small or a large number of pieces, every one the precise counterpart of every other, would immediately be apparent. That such an assertion can be made in an æsthetic journal justifies the provision of facilities for obtaining correct data; since the delusion under which the reviewer labors is common enough among amateur artists who have failed, and those also who learn the issues of their ill-judged experiments. In one aspect of the matter, great ignorance is in a measure pardonable. Not every one possesses means of knowing that the art-potter must be not only an artist, but also a chemist; that he needs a familiar acquaintance with the action of fire in altering the chemical constituents and effects of colors; that he must be aware of differences in quality, since all the colors produced by the grinders are not equally stable, any more than all the building-stones that are quarried are capable of withstanding the insidious influence of the atmosphere. As in fresco-painting, so, also, in china-painting, there are colors which are unsafe; some that will vanish, some that will not fuse; and, again, others that eat into and destroy whatever pigments chance to be placed in immediate contact with them. Thus, in a figure-study, one desires a rose tint, to show the effect of the setting sun upon the delicate white dress of a bride, and hopes perchance to get it by a slight infusion of an appropriate tone with white. The white will stand, while the tint absolutely disappears; and the perplexed amateur discovers, if she be fortunate, that no known color will fuse with white, which must be first fired separately, and then lightly tinged afterward according to one's wish. Blues and yellows also are equally decided in their action, though in a different mode; and while a great deal depends on the relative amount of color laid upon hard or soft porcelain, it is of vastly more moment to subject a piece to a precisely regulated temperature, since but a trifling variation in reduction or excess of heat may educe from a single pigment any of the hues of the rainbow. Hitherto the literature of ceramic art has been conspicuously barren of technical treatises. The men who pass long years in the ateliers of the masters, and those who through experimental failures push on to ultimately assured success by an almost interminable "rule of thumb" course, possess neither the leisure nor the qualifications to write. Books upon distinguishing marks, illustrated histories, and merely discursive essays upon peculiar wares, exist everywhere without stint. The first genuinely practical *hand-book* yet heard of has only recently appeared, however; and even this has no publisher, and is, therefore not named in the book-lists, nor procurable through ordinary channels. But Édouard Rischgitz' work, small though it be, is an acceptable contribution to literature; and we shall look with especial interest for other handbooks that will follow this one upon *China-Painting on Glaze*, which may be warmly commended to art-students as an invaluable aid to their studies.

The greatest want of the time — and this not for Great Britain only, but also for the chief centres of culture, of population, and of manufactures in the United States — is a series of trade-museums exhibiting raw products, and the uses to which they are put in every stage of manufacture. Manchester possesses an admirable and well-supported society for the promotion of scientific industry, whose exhibitions of economic appliances are most useful; but no museum of textile fabrics exists in Bolton, Bradford, Leeds, Manchester, Nottingham, Oldham, Paisley, Preston, Rochdale, or any other seat of the manufacture. A private museum of firearms is little known at Peckham, in the south of London, while the chief seats of the manufacture of arms are the great towns of Birmingham and Sheffield, and the still more distant works at Elswick. Northampton and Wellingborough have no museum of the leather industries; and Stoke-upon-Trent and Lambeth alone are the possessors of art-schools which directly serve the potteries of those districts; while, in regard to household decoration, the designing of furniture, and all the industrial arts allied thereto, the Museum of the Science and Art Department at South Kensington has hitherto failed to furnish from the ranks of its students, even one whose training has been sufficiently practical to afford the least chance of permanent employment. That the Museum has been worth all it has cost is unquestionable, nevertheless. Dr. Forbes Watson closely parallels an observation made long ago in an American journal by the present writer, when he says, "The existence of the South Kensington Museum has in no way originated the movement of artistic reform now pervading all England, although it has accelerated its pace. After Pugin had first traced the principle of functional truth and organic development in architecture, and after Ruskin had shown the application of the same ideas to the whole range of art, whilst Owen Jones established their application to color and ornamentation, it was quite certain that those ideas would in time prevail, because, in a progressive country like ours, all ideas founded on truth and nature will always force themselves, though gradually, into general acceptation. South Kensington has not developed a single man with artistic initiative who can be compared to those just named, nor has it added a single new idea to those which men propounded before it was ever thought of; but there are many ideas which, but for it, would have continued to this day as mere suggestions, instead of being already widely introduced into the practical arts of this country." These words, the truth of which is easily demonstrable, establish the point that on the lowest estimate of usefulness of a finely furnished art-museum, its resulting advantages to a nation are very great, — a lesson that is quite as valuable on the western as on the eastern side of the Atlantic.

The specific claims upon the English people of various industries to direct and full representation by means of trade-museums, cannot fail to derive a new impetus from the proximate foundation of an Imperial Museum in London. The project is of vast proportions, embracing within its scope all the colonies and dependencies of Great Britain; but its success is certain so soon as the Dominion shall have given its adhesion, as its interests would prompt the anticipation that it shortly will have done. The plan marked out by Dr. Watson involves the erection of a building, or rather a series of sections, each of which shall in its architecture as well as in its contents preserve intact the special characteristics of the colony to which it is to be devoted; each colony determining and paying for the space it will occupy, and, by the association with the museum of the offices of the several colonial agents in London, facilitating ready reference from offices to museum, and from museum to offices; at the same time as, by the saving of scattered office-rents, the cost of building and maintenance would be reduced to a minimum.

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The points which demand the greatest care, in the first instance, are those of location and character. Under the *régime* of Sir Henry Cole, the bent of the Government in the matter of museum sites displayed a tendency toward concentration at South Kensington; and it is notorious that a refusal to place the Museum of Patents under the formerly capricious sway of the Science and Art Department is the sole reason for condemning it to remain housed in an iron-shed, where few people discover its existence but by mistake. To be of practical use in advancing the knowledge of *technique*, a museum must be near the spot where the technical interest has become, so to speak, already localized; and Dr. Watson appositely indicates, with this idea in view, a site that is owned by the Government on the Thames Embankment, as pre-eminently suited to the erection of the Imperial Museum. With respect to character, Dr. Watson's scientific experience leads him to set his face decisively against any mere effort to attract and please the populace. And in this he is wise. What is required is to give new life to manufactures and commerce, not to produce a show; the appeal must be made to an informed, not an uninformed public; it is not the crowd that is sought to be drawn together, though it would not be excluded, but the men and women who have eyes to see and minds to think upon whatever may tend to the material progress of the colonies and the mother country. And, the better to subserve the end in view, it is not proposed that the Imperial Museum shall stand alone. The typical collections of the British colonies at Philadelphia were beyond praise for their completeness and uniqueness; the visitor taking in at a glance a general notion of the progress made by each, and brushing away numerous cobwebs which before held possession of his brain concerning the rude and imperfect civilization imagined to prevail at the antipodes. Such typical collections, valuable as they are, cost comparatively small sums; and their presence wherever colonial products are used in manufactures cannot fail to promote an increase of local industry. By such a distribution of resources, the *nuclei* of trade-museums will be furnished; the central museum being not only a store or reservoir of the accumulated knowledge of generations, but likewise a laboratory or workshop in which the typical collections would be prepared. The fruition of this scheme means for Britain and her colonies, so much more than meets the eye, that any failure of public spirit and energy in giving effect to it is hardly to be looked for. Let it be realized, and the cities of Germany with their technical universities will speedily fall behind the manufacturing towns of England, while the commercial interests which unite the English-speaking race throughout the world must be strengthened by the interweaving of new industrial strands.

CONVERSAZIONE OF THE NEW YORK CHAPTER A. I. A.

NEW YORK.

THE architects of the New York Chapter A. I. A. and their friends celebrated Washington's birthday by an evening gathering and exhibition of work at the studio of Mr. Richard M. Hunt, on East Twenty-first Street, near Fifth Avenue. The idea of introducing a greater degree of sociability into the winter exhibitions of the Chapter came, I believe, from Mr. Carl Pfeiffer. Mr. Hunt, the president of the Chapter, at once offered his hearty co-operation, and the use of the building occupied by him. No undue form was to be allowed; and to this end invitations were judiciously distributed, and with but few exceptions accepted. Prominent members of the profession without the Chapter rolls were present and cordially greeted, as were representative workers in the sister arts of painting and sculpture. The rooms were lined with casts from famous works, and pieces of *vertu*, brought from near and far by Mr. Hunt. Interspersed were perspectives and drawings from the offices of New York architects. In one room were grouped the competitive drawings for the Junior Members' Prize. To a design for a public library building, by Mr. H. E. Ficken of Messrs. Potter and Robertson's office, the verdict of the many experienced critics gave the palm of merit. The grouping of parts was less conventional than in many of the other drawings sent in, to any of which honorable mention might honestly have been given. Between eight and nine o'clock the company were called to order in the main drawing-room by Mr. John Taylor Johnston, who introduced Prof. Henry Weir of Yale College, who delivered an address on "The Relations and Points of Contact between the Arts." Prof. Weir's carefully studied address, tracing out the interdependences of architecture and its auxiliary arts, and pleading for a deeper and broader culture for architects, was listened to with the closest attention.

At the finish of the paper a vote of thanks was unanimously tendered. Dr. Osgood added a few extemporaneous remarks. He thought that the prospects of art to-day were brighter than they had been for centuries past. The feeling for art had gone out to the whole people, to the great body of the populace at least, instead of being the possession of a class or caste. He thought well of the suggestion that all artists, architects not excepted, would do well in going out, and in various ways educating the people to an appreciation of their aims and purposes. It was not enough that fine buildings attested the skill of the designer and stood silent monitors against bad taste, but some effort from those who could was necessary that all should feel the full mission of such structures. He was proud that the finest ecclesiastical building in this country to-day stood in his beloved Boston, and equally proud was he that the work came from the brains and fingers of two New York architects. (This allusion to Messrs. Gambrill and Richardson's recently completed Trinity Church was received with applause.)

From his city residence he had drawn in from day to day draughts of pleasure and enjoyment in the uprearing of the Third Judicial District Court House, and now the completed tower with the pile at its base was a never-failing source of instruction. In broad sunlight and the dim starlight, with the moonbeams playing about it, and in every condition of light and shade, he had gazed upon this work, and hoping for the public opportunity which he now seized of thanking Mr. Withers for the fund of enjoyment he had provided. He had heard of troubles the architect had experienced with his workmen, and heard with pleasure of the vindication therefrom, and would close by rejoicing, —

> "Let the galled jade wince,
> Our withers are unwrung."

The ladies and gentlemen then passed down to supper, and general conversation occupied the remainder of the evening. The new departure from the stiffness of a mere picture-gallery exhibition, and the modest endeavors of the fortnightly "coffee sociables" of the Chapter members, was voted a great success.

RESPONSIBILITY FOR ACCIDENTS.

BOSTON.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — Referring to the editorial remarks on the article entitled "Responsibility for Bad Building," in your issue of Feb. 10, permit me to cite you a case of actual occurrence which I regard as apropos to the question of the responsibility of architects, owners, and workmen, and which I think quite important especially for owners to understand. The case is as follows: One of our tenants wishing some slight improvement to a front doorway, a painter was asked to look at the work, and name a price for repainting the same; he did so, and wrote the amount for which he would perform the required work on the back of his business-card, signing his name in due form, with date, location, etc.; his bid being satisfactory was accepted, and he was instructed to proceed with the work. Whilst so doing, he unfortunately let fall a sign which he had momentarily detached from the building; a person who happened to be passing at that moment was struck by the falling sign, and badly hurt. In due course of time we received a polite lawyer's letter, asking us to settle the claim for damages to the person so injured, to the amount of $3,000. We put the case in the hands of a law-firm; and it was found, both as a matter of law and precedent, that the simple fact of the painter's submitting his proposal in writing in due form, and our acceptance of his offer thus made, relieved *us* from all legal responsibility, and made *him* the principal in the matter of all risks during the performance of the contract. Had we employed him by the day, he would have been legally considered as our agent, and we could have been compelled to respond to the claim. The turning-point in our favor was that the *work was done by contract*, and the contractor was the responsible party.

I assure you, Mr. Editor, that under the above ruling all repairs, alterations, and improvements with which I have to do are performed under contract, no matter how small the amount involved.

Yours truly,

F. H. M.

BUILDING AT MILWAUKEE.

MILWAUKEE, February, 1877.

EDITOR AMERICAN ARCHITECT.

The following extract taken from the annual report of the Board of Public Works of this city, just published, gives hope that the efforts made by architects and sanitarians of late years for improvement in the construction and arrangement of public school buildings is at last having some effect on the public mind. It has been too common with newspapers and the unthinking public to attribute all the ills connected with badly constructed and worse ventilated school buildings to architects and builders, forgetting that behind them was a school board or common council hampering and controlling the architect. H. C. Koch of this city is the architect of the building on Cedar Street, which is highly spoken of by the Board of Public Works.

"SCHOOL BUILDINGS AND GROUNDS.

"The demand is constant from all parts of the city for increased school accommodations and increased conveniences; the demand, however, being more imperative from the growing portions of the city than the older settlements.

"The construction of a new building on Cedar Street between Eighteenth and Nineteenth Streets, for the second and fourth wards, is in progress. The contract for the same was let June 2, 1876, — work to be completed July 1, 1877, — for the sum of $30,034.

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To this must be added the cost of pressed brick in place of common brick for the surface, about $2,500. The present indications are that the building will be completed in advance of the time set.

"This building, and an additional story to the Humboldt School Building, Sixth Ward, let for $5,166, and now completed and occupied, are all the new school buildings or additions erected during the past year.

"The old building on Tenth Street near Walnut, known as the Washington Schoolhouse, and for a time abandoned for school purposes, has been put in order again for services at small expense, though not yet occupied. Two rooms at the corner of Third and Beaubian Streets, for the use of the Thirteenth Ward, have been rented, and are occupied. These, with the addition of the Humboldt Schoolhouse mentioned, comprise all additions made to schoolhouse accommodation the past year.

"The current expenses for repairs, material, and work generally in connection with the public schools, have been comparatively light, amounting from March 1 to Dec. 1, 1876, to a gross sum of $17,787.75. In 1875 this sum aggregated $31,373.59. Of the sum expended the past year the analysis is as follows:

For repairs and improvements	$13,021 69
For new school furniture	3,147 95
For heating apparatus	829 77
For rent paid for buildings	758 34
	$17,787 75

"The problem of proper warming is still an unsolved and vexatious one. During 1875 the furnaces in use in school buildings, having proved a failure, were superseded with stoves. These of course will do the heating if enough of them are supplied. The inclement weather of this year has brought many complaints to the board of insufficient heating in some of the schoolhouses, and compelled some additional purchases and placing of stoves.

"But this mode of heating public buildings with a separate apparatus in every room is behind the age, and cannot long be tolerated. Nothing can be more clumsy or more expensive. Plans for warming the large building now being constructed on Cedar Street for the Second and Fourth Wards were carefully drawn, contemplating steam with radiators or coils. The contract for a complete apparatus sufficient for the building, with cast-iron radiators, was let to W. E. Goodman for the sum of $7,000. This apparatus is now nearly completed. It is not an experiment, having proved itself highly successful."

THE INDIANA STATE-HOUSE COMPETITION.

WE extract the following item from the letter of an Indianapolis correspondent: —

"The second competition for the Indiana State House promises to be as hotly contested as the previous one was; quite a number of competitors are in the field. A bill has been introduced in the legislature, which provides for a commission of four members of the legislature, with the governor as chairman. The cost is limited to $2,500,000. Some favor the appointment of an architect with a yearly salary; but that is not likely to be adopted. Considerable lobbying is being done by some of the competitors. The last competition was not very satisfactory to any concerned; quite a number of designs were submitted, good, bad, and indifferent, the latter largely predominating. The State was never in a better condition to build a capitol; the terms are favorable, and certainly the architectural talent will not be wanting.

"The old tumble-down structure which is by courtesy called a State House is a disgrace to the State of Indiana, and it shows the inability of the architect who designed it to adapt the classic style to the wants of modern times; he attempted to reproduce a Greek temple, instead of using the principles as the Greeks used them, and applying them to the problem under consideration."

JOURNEY OF AN ARCHITECT IN THE NORTH-WEST OF EUROPE.[1] — VI.

PRIVATE HOUSES AT HANOVER.

THE house which is represented by fig. 111 is a semi-detached double house, being intended for two families who wish to live side by side and united, yet entirely independent of each other — a combination frequent in the North, where families and friends love to assemble in the same quarter and the same streets. A dwarf wall surmounted by a balustrade is built in front of the public road; and a free space, serving as a terrace-walk before the drawing-rooms, separates the building from the street, and keeps passers-by at a distance. A covered porch protects the front steps, which rise from the level of the street to the ground-floor. The kitchen and its offices are placed in the basement; on the ground-floor are a drawing and dining room, each having attached to it a secondary apartment. These two rooms, the most important in the house, are comparatively small, but they can be united so as to form but a single room. On the first floor there are two large bed-chambers with dressing-rooms, and above these the school-room for the children, the nursery bedroom, and two for servants. This dwelling-house is well adapted to a private family. The rooms are lofty, being thirteen feet in height; the mode of access is easy; while the terrace-walk and the balcony allow the residents to go in and out, and add a charm to the interior of the house. The architectural forms adopted in the fronts (fig. 111) are not like those which we are accustomed to see in modern French houses; they rather resemble certain monastic habitations of the middle ages, views of which are given in archæological publications. The proportions are not perfect; but the details have been carefully studied, and show that the architect has endeavored to give to his work a special appearance peculiar to itself.

The mode of construction is in good taste and keeping. Bricks, with a few blocks of stone, form the principal part of the building. These bricks are yellow, red, or black. This variety of color has permitted the introduction of imbricated work, the use of which enlivens the general effect. The dimensions of these bricks are rather different from those employed by us, being about 2.36 inches in thickness, 5½ inches in width, and 9.6 inches in length. The stone is white, and of a good quality.

We make remark, before we proceed further, that two circumstances give to the houses of the North in general, and to those of Hanover especially, a peculiar aspect: on the outside the absence of blinds; and within, that there are no fireplaces.

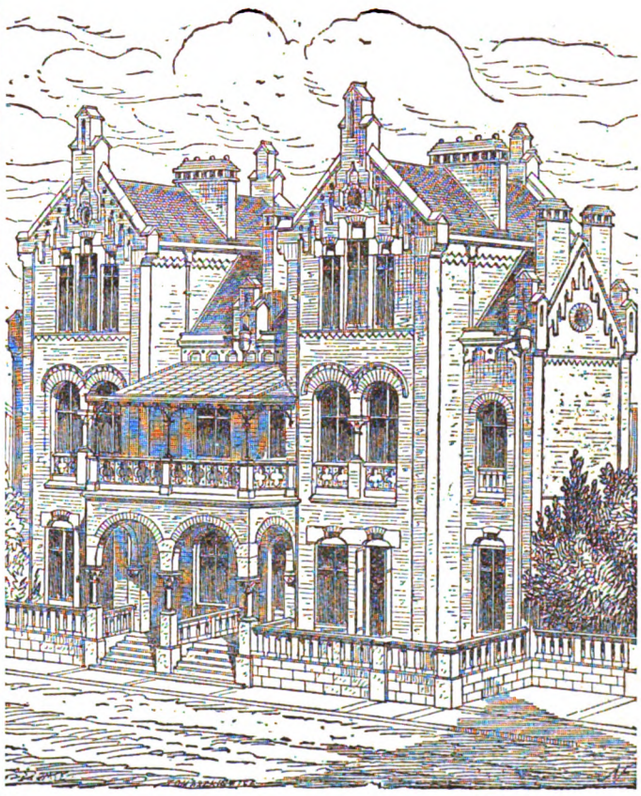

Fig. 111.

The custom of standing at the window is not permitted; and so the window-sills do not project beyond the outer wall, but are flush with the inner surface of the frame, and incline outwards to the front. On this slab flowers are placed, and sometimes birds are kept in the intervening space. On the inside a second glazed window-frame forms an enclosure, opening by a small casement rather larger than our usual panes of glass, which is intended to give fresh air to the apartment. Stoves are substituted for fireplaces. The heat given by them is more equalized; it is greater, and especially more economical, than that of an open fire; but this plan deprives the room of an ornamental feature, which stands out so prominently, and by which we produce such striking effects. The looking-glasses have no invariable position; they are of small dimensions, and many rooms are entirely without them. Clocks are rare, *even at the present time;* and what we are accustomed to call chimney-ornaments are usually placed on a console table fixed to the wall. The reception-rooms in the interior of these dwelling-houses are not decorated in a manner out of proportion to the fortune of the inhabitants. Stucco-work, imitation marble, plaster ceilings with gold on a blue ground, and cupids in papier-maché, are not in favor. The construction is simply carried out; and the parts thrown into relief are decorated in a manner, the least merit of which is that it is reasonable and sensible.

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NOTES AND CLIPPINGS.

THE STATUE OF LIBERTY. — The House of Representatives has passed a vote authorizing the President to accept the statue of "Liberty Enlightening the World" when presented by the French Republic; and to designate a suitable site for said statue on either Governor's or Bedloe Island, in the harbor of New York.

THE BELLS OF ST. MARK'S. — The Court has granted an injunction restraining the congregation of St. Mark's, Philadelphia, from causing the bells of their church to be rung.

BOSTON POST-OFFICE. — An additional appropriation for the payment of the two lots of land on Post-Office Square, which will complete the site to be occupied by the building for the Boston Post-Office and United States Sub-Treasury, has already been placed in the appropriation bills. The total amount appropriated for continuation of building and purchase of additional land was $805,655.98. To the 30th of September, 1876, there had been expended $618,406.79 for additional land, and $182,486.45 had been expended up to the same date on the extension; leaving an unexpended balance of $4,742.74 when the work was suspended. There is stone already paid for, which cost some $40,000.

A CENTENNIAL EXHIBITION BUILDING. — The Carriage Annex of the Main Building at the Centennial Exhibition has been shipped to Maryland and turned into a fire-brick factory.

ST. PATRICK'S CATHEDRAL. — The block on which stands St. Patrick's Cathedral, New York, originally belonged to the city; and in 1799, when New York was a part of the diocese of Baltimore, this plat was leased by the municipality for the annual rent of four bushels of wheat. It was afterward transferred to the trustees of St. Patrick's Cathedral for $83.32. The corner-stone of the cathedral was laid in 1858. Two years will probably be required for its completion.

A HEAVY EAGLE. — From a block of marble weighing two tons, an eagle measuring six feet between the tips of its outspread wings is now being cut for the Grand Army Monument which stands at Reading, Penn.

A LARGE ORGAN. — It is proposed to place in the Music Hall now building at Cincinnati, O., an organ which shall surpass in size, design, and excellence of tone, the organ in the Boston Music Hall.

THE BRICKLAYERS' STRIKE. — The bricklayers formerly employed upon the new building of the Messrs. Doulton have abandoned their strike.

ART-POTTERY. — The Messrs. Minton have lately delivered at South Kensington the large panel about fifty-four feet square, representing "The Triumph of Truth and Justice over Ignorance, Superstition, and Crime," which is to ornament the lower part of the western staircase in the ceramic galleries. This part of the museum is lined with embossed maiolica executed by the same firm. The lining consists of stone-ware tesseræ cemented together in the fire, and afterwards painted in colors which are submitted to a high heat, after which they are able to resist the gases and acids that are so deleterious to fresco-paintings. The process is known as the Campbell mosaic process.

BUILDING-SOCIETIES AS A QUARTER FOR INVESTMENT. — The Artisans', Laborers', and General Dwellings Company (the owners of Shaftesbury and Queen's Parks, London), which was established in 1867 for the purpose of providing accommodation for the working classes, has for several years past declared a dividend of six per cent. The Temperance, Provident, London, General, and Birkbeck Building Societies have paid equal dividends; and there are several similar associations in Lancashire which are returning dividends to their shareholders at the rate of fifteen per cent per annum.

STUMPED. — The vicar and church-wardens of an English church objected lately to having in their churchyard the tombstone of a professional cricketer, on which are sculptured stumps, bails, and bat. In Scotland, however, it is not unusual to cut upon the tombstone the symbols of the trade followed by the deceased. Thus at Dunblane about one-quarter of the tombstones that are from one to two hundred years old are marked with such symbols. A sugar-cone shows the grave of a grocer; an axe and saw the grave of a carpenter; while a hammer and awl are found on the tombstones of shoemakers; while at Burny Church, Nottinghamshire, the monument which was erected about the middle of the last century to Sir Thomas Parkyns, who was famed as a wrestler, represents him in the cap and dress of a wrestler, wrestling with Death. At Brompton Cemetery, the monument of a well-known Thames waterman exhibits his wherry and sculls.

THE LONGEST BRIDGE IN THE WORLD. — The bridge now building over the river Tay in Scotland will be, it is said, the longest bridge yet built over a running stream. In form it is not unlike the letter S. It is to 10,321 feet in length; and the estimated cost is £220,000.

TOO HIGH. — It is rumored that a block of dwellings thirteen stories high is to be built on the land on the east side of the Royal Albert Hall, London.

COST OF DISINFECTANTS. — Experiments recently made with disinfectants in London have shown that a complete disinfecting of the refuse of that city would cost the enormous sum of £4,000,000 sterling per annum.

LE PALAIS DU CONSEIL D'ÉTAT. — The ruins of the building of the Conseil d'État, on the Quay d'Orsay, Paris, are to be pulled down, and the site occupied by private hotels.

THE TROCADÉRO. — Napoleon I. intended to build upon the Trocadéro, which, thanks to the Exposition of 1878, will become as familiar as a household word with the present generation, a palace which in design, grandeur of execution, and appointments, should surpass any of the royal palaces of Europe, be it Versailles, the Escurial, the Pitti Palace, the Palazzo Reale at Naples, or any other. Its pleasure-grounds were to have been the Bois de Boulogne.

THE TOWERS OF COLOGNE CATHEDRAL. — The two towers of the Cologne Cathedral, which are now approaching their completion, will be, it is said, the loftiest towers in the world. Their height will be 151 mètres, or 495½ feet. This, as we have before said in speaking of the central spire of Rouen Cathedral, is but a precarious claim to distinction which they may deserve for as short a time as has the cathedral at Rouen.

THE ROMAN SALON. — It was some time ago proposed to institute a *salon* at Rome after the fashion of the Paris *salon*. A government commission was formed, and a competition opened to secure plans for a proper building. Of the twenty-eight plans submitted, not one was found worthy of even the offered prize, much less of being carried into execution.

ITALIAN CHURCHES. — Mr. Edmund Sharpe, with two assistants, is preparing to make measured drawings of the churches at Pistoja, Pisa, and Lucca.

IRON HUTS. — Orders have been given by the Russian Government to the manager of the Imperial Iron Foundry at Tula, to construct forty thousand iron huts for the accommodation of troops.

PRIMITIVE FIRE-PROOF BUILDINGS. — During the winter months, the Japanese towns are liable to be devastated by fires, as at Tokio, where in eight hours, on the 29th of November last, nearly ten thousand houses were totally destroyed; yet in the midst of this conflagration were several hundred buildings, known as "mud godowns," which remained uninjured; and in view of the materials of which they were built, it is not at all improbable that they were even benefited by the fire. These godowns, which are used as storehouses for the preservation of valuables, are made of clay which is slowly packed into the space intervening between two sidings of bamboo or light boards, which are about eighteen inches or two feet apart. The clay dries by the action of the atmosphere alone; and consequently some of these primitive fire-proof structures are two or three years in building. It is fortunate for the world that the Japanese have these storehouses for the preservation of the products of their wonderful workmanship. It would be interesting to know whether these godowns are public storehouses, or whether they form part of the appointments of a nobleman's estate. It would also be interesting to know how the doors and windows are made fire-proof.

SPONTANEOUS COMBUSTION OF A SAFE. — The Detroit *Free Press* tells of the burning of a safe, that occurred about thirty-five years ago in that city. The safe was of thick iron, filled between the inner and outer lining with stout oak timber kyanized and otherwise prepared with chemicals to render it incombustible. It stood for years in the banking-room of the Bank of Michigan, near a large old-fashioned stove. One morning, before the safe was opened, smoke was seen issuing from the crevices between the plates, which were gradually becoming red-hot. The excited cashier succeeded in opening the door, and saved the contents of the safe; but in order to save the building a hole had to be made in the wall, and the safe tumbled out into the roadway. There it smoked and smouldered for a week, until the filling was wholly consumed. It is supposed that the heat of the neighboring stove decomposed the chemicals used in preparing the wood, and thereby encouraged spontaneous combustion.

A NEW KIND OF INSURANCE. — The *Société Industrielle de Reims* has proposed a novel kind of insurance, which has such good points in its favor that we think it might be adopted in this country to the advantage of all parties concerned. It very often happens that when fire either totally destroys a manufactory, or so injures it as to put a stop to its operations for a longer or shorter period, the manufacturers — whether private individuals or corporations — influenced by motives of humanity, pay to their operatives thus abruptly deprived of their means of livelihood one or two weeks' wages. In this way the proprietors suffer a considerable loss in addition to that caused by fire. It is now proposed to insert a clause in insurance-policies, representing capital equivalent to the total wages that would be paid during one or two weeks, — at the option of the holder of the policy, — to all the employees of the manufactory, on which a premium must be paid, based upon the average of premiums adopted in insurance; with the stipulation that this sum should be paid instantly on the evidence that a fire had taken place, and before the liquidation of all other claims that the insured might have on the insurer. Such a scheme would be for the advantage of insurers, as it would increase the capital insured, and consequently the premiums received, without increasing the risks.

A NEW WAY OF OUTLINING THEATRE SCENERY. — In the London theatres, scenic artists are now availing themselves of photography and the magic lantern in the production of scenery. The artist, instead of drawing on his imagination for a group of mediæval houses to represent the market-place at Rouen, for example, procures a large photograph of the actual locality. This, by means of the oxyhydrogen light, he throws upon the canvas, the image being suitably enlarged in size. Then he follows the outline, and has an accurate picture.

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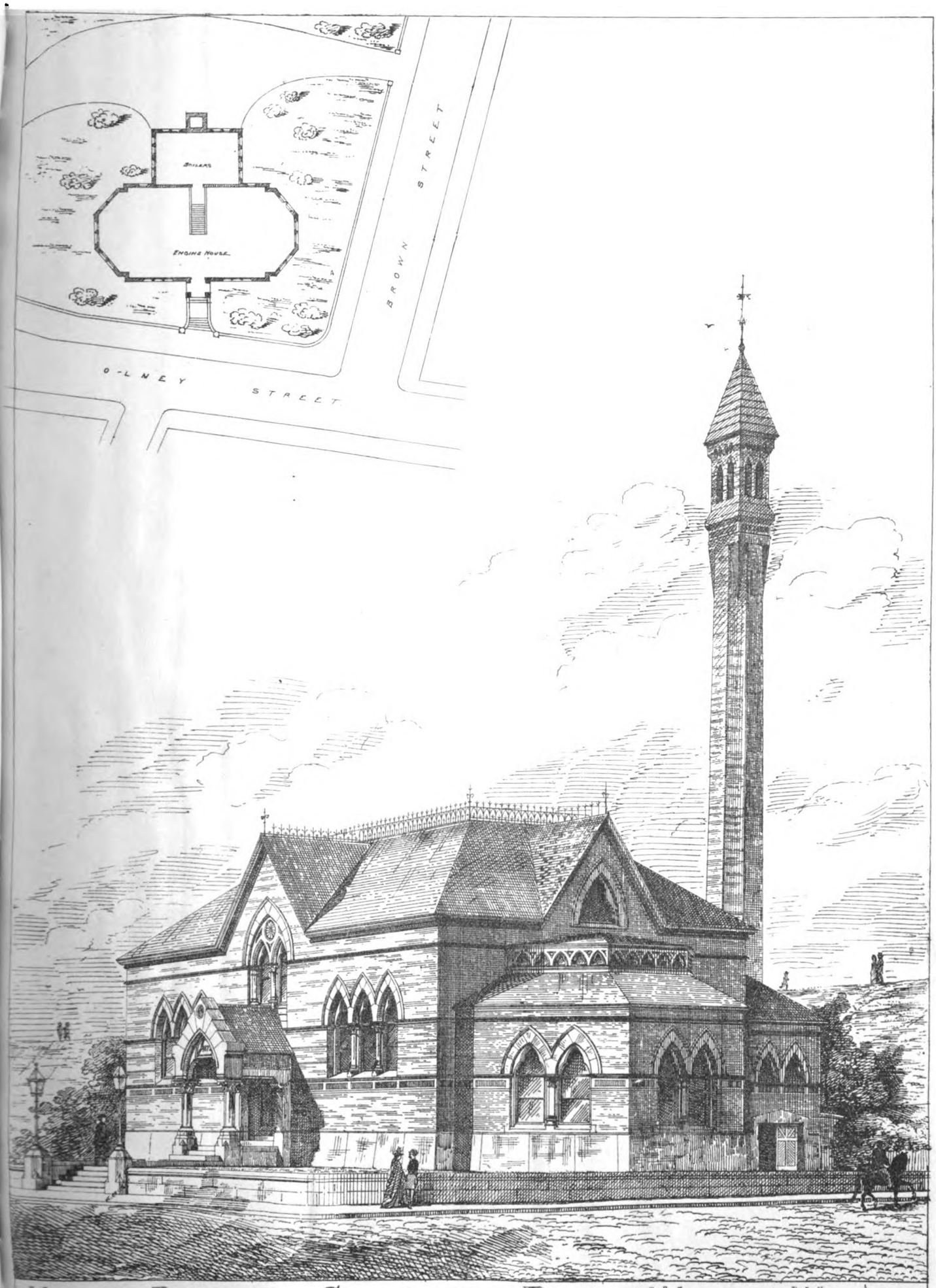

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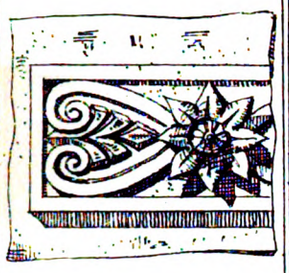

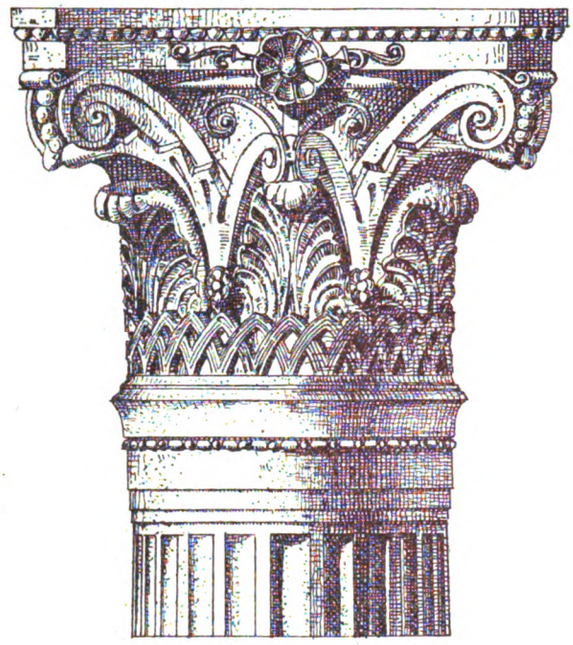

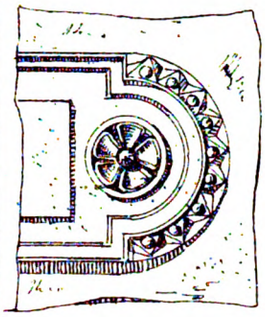

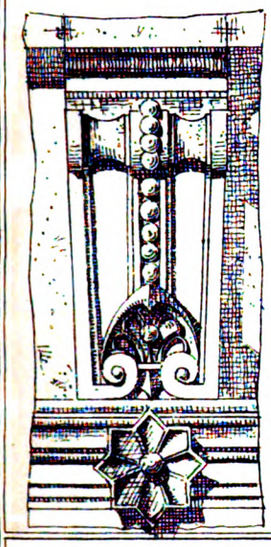

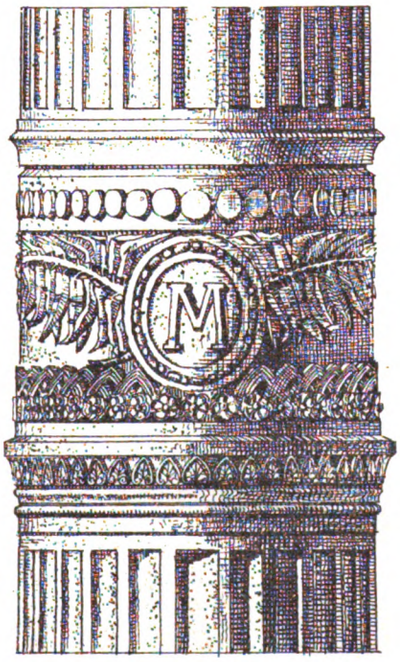

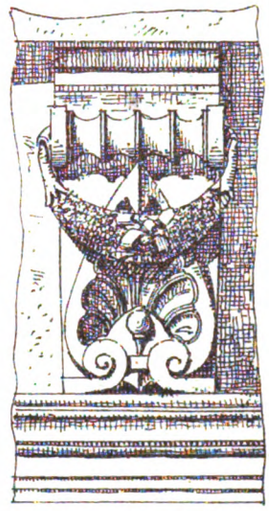

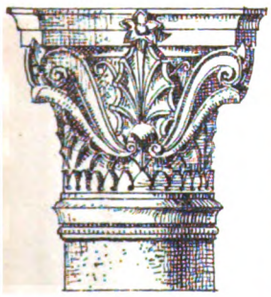

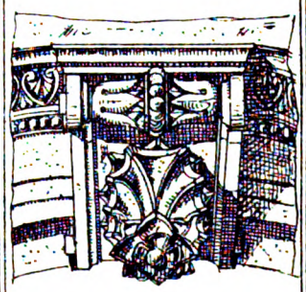

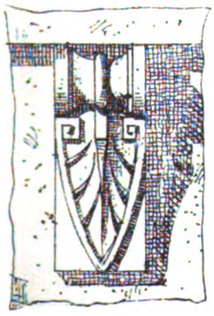

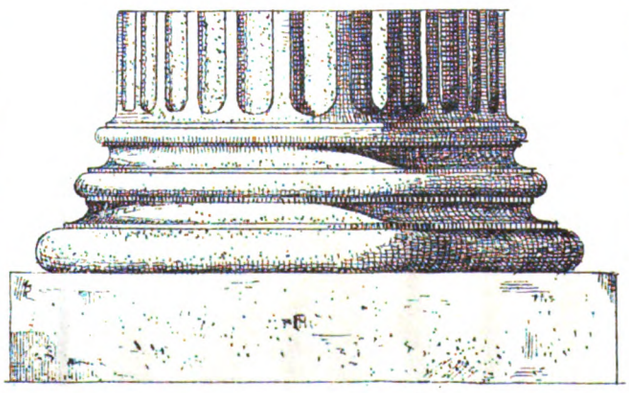

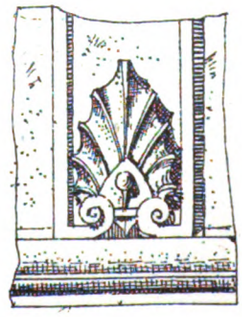

John P. Riley —

Peabody & Stearns Archts Boston

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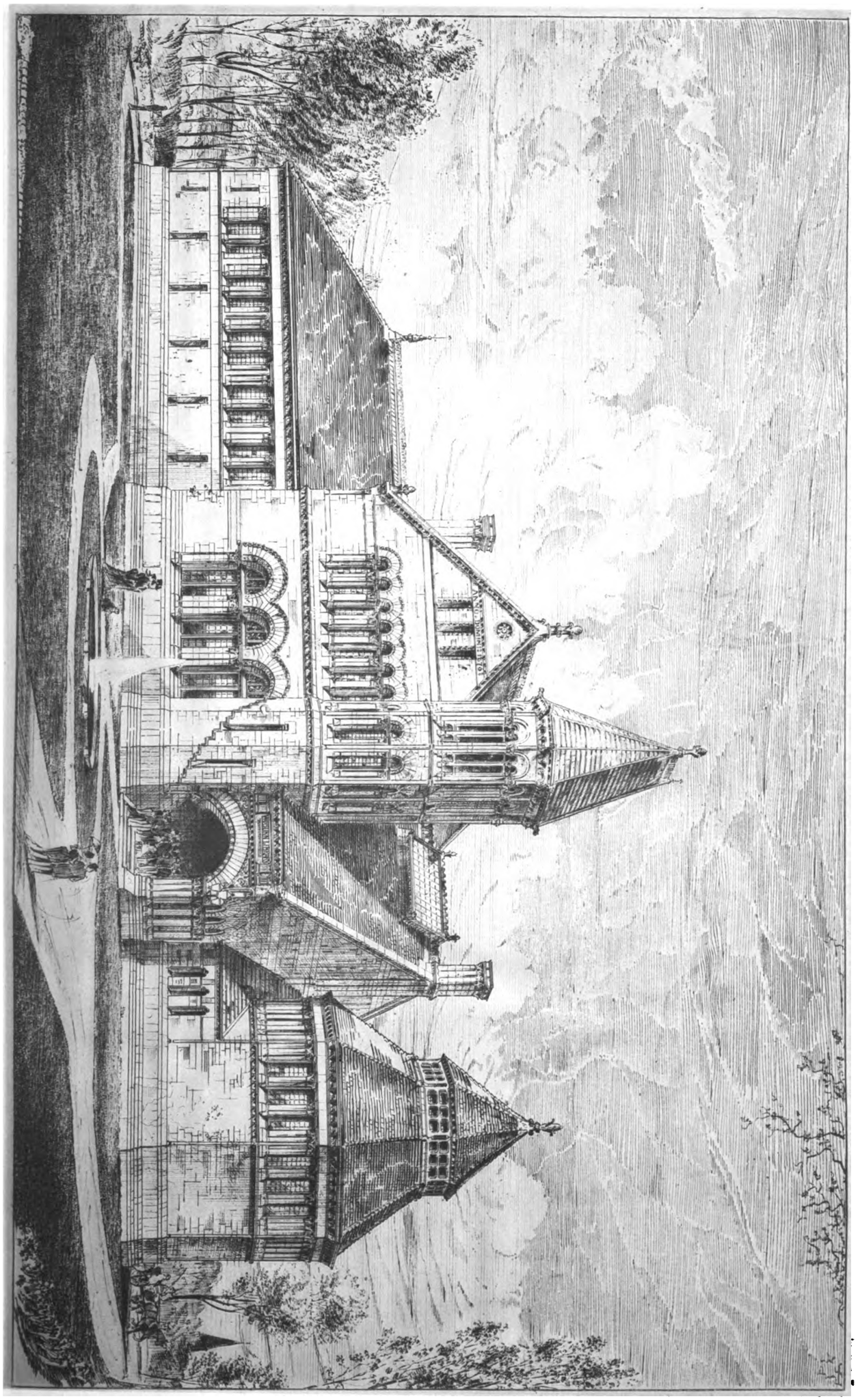

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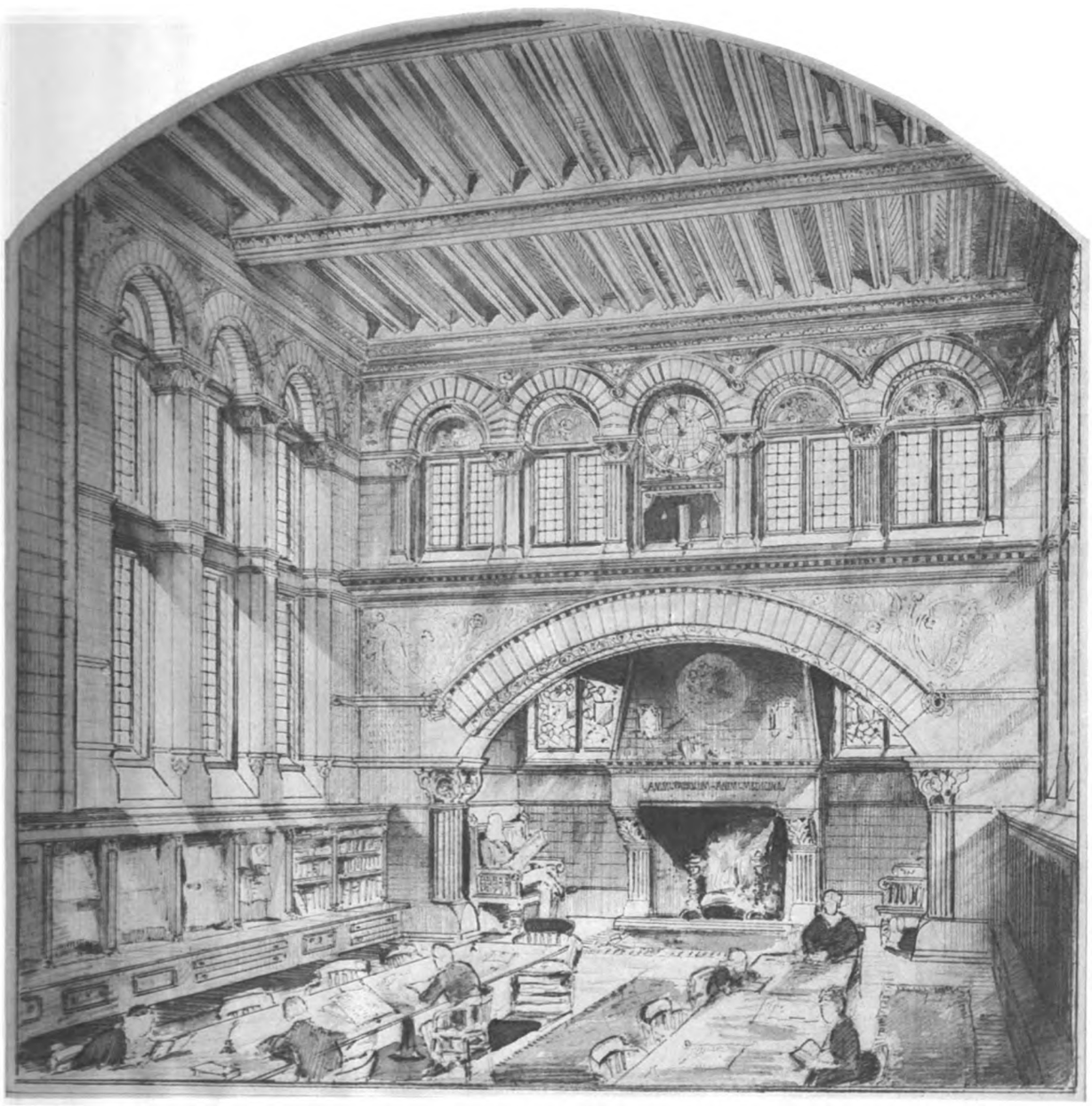

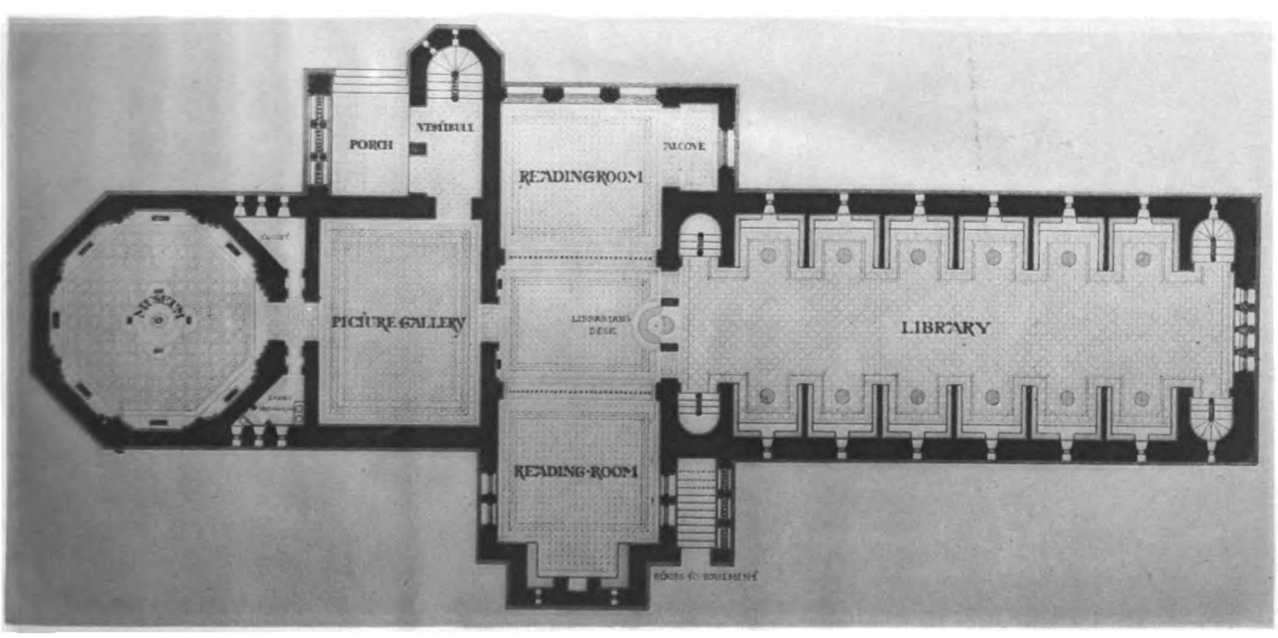

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, MARCH 10, 1877.

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FOURTEEN months only are to pass before the opening of the Paris Exhibition, and in that time there is an almost inconceivable amount of work to be done not only by the French but by foreign nations. There is little doubt that the French, backed by government subsidies, will have performed their part well and in due season; for they have stored up the lessons of their former exhibitions which taught them the value of thorough planning and the proper subdivision of labor. They have maturely considered their scheme, have begun on it betimes, and are pushing it with busy industry, so that there is but little chance that their share of the work will cause disorder by the unfinished condition of the buildings or their approaches. Other nations have appointed their commissioners, and are already at work preparing to receive and arrange the exhibits of their respective countries. England has appreciated the services that Mr. Cunliffe Owen has rendered to the nation at former exhibitions, and has placed him in the position due to his training and experience. Our Government could not do better than to follow this example, and place upon its commission some of the men who managed so successfully the late Centennial Exhibition. But as yet Congress has taken no step in the matter, and there is no small chance that the American exhibit may be in as disordered condition on the day of opening as it was at Paris in 1867, and at Vienna in 1873.

BUT even if Government has not yet taken any step, there is much that can be done by private individuals and corporate bodies, that will need only the future sanction of the United States Commission; and it is not too soon for such to begin their arrangements. If it is kept in mind that the rooms set apart for the architectural exhibit at Paris will not be as empty and neglected as were those at Philadelphia last summer, the propriety of making some united effort toward securing a more satisfactory and more complete showing of what American architecture has accomplished, and what promise it makes for the future, would be seen at once. It would be feasible to appoint a commission whose members should be chosen from the best men in the Institute and outside of it, which should have it in charge that the designs and drawings that are sent to Paris shall not do us unnecessary discredit when contrasted with the thoroughly studied and delicately rendered drawings of French architects, or the picturesque and brilliant pen-and-ink work of the English architects. It is sincerely to be hoped that some united and timely action may be taken to exclude the many *bizarre* and fantastic designs — so called by courtesy — that are sure to be sent in; and this can only be done by placing upon the commission men of the highest attainments.

THE following extraordinary resolution is reported in the papers from a recent meeting of the Boston School Committee. The windows of the upper story of the schoolhouse in question had their sills five feet from the floor, while those in the lower stories were but three.

"Whereas, any theory relating to the admission of light, which is correct in its application to thirty-two windows placed *three* feet from the floor in eight rooms, cannot be correct in its application to ten windows placed *five* feet from the floor in two rooms, all in the same schoolhouse, . . .

"*Ordered*, That the City Council be respectfully requested to cause the windows of the two schoolrooms described in the preamble of this order, to be lowered to the height of the windows in the other schoolrooms of the same building."

The circumstances of the particular case in question are not important enough to be hunted up, but the resolution is a fair example of the free and easy way in which authorities sometimes set themselves to lay down general laws in matters in which they are not expert. Why, one is tempted to ask, should any "theory relating to the admission of light" be expected to give the same results for all rooms? or why give results so minutely decisive as to allow of no variation? or why are theories relating to the admission of light the only things to be considered in placing windows? or why should such a question be decided by a majority vote among windows? or what has their being all in the same schoolhouse to do with theories of lighting? As a specimen of the hasty reasoning which often does carry away committees to the discomfiture of architects, this is worth notice.

THERE are three practical considerations that influence the placing of windows in any building. These are, — their use in lighting and ventilating the building, constructive convenience, and architectural effect. They are all legitimate and important considerations, in their due order, in which of course the first is the chief. He takes a foolish part who essays to determine a question of windows without regard to them all; but there are limits within which each may reasonably yield to the other. In rooms which are to be used as sitting-rooms or living-rooms, especially where there is any view to be seen, it is a crying fault to set windows so high that people in their chairs cannot look out of them with comfort. But in places set apart for special services, as churches, or where any occupation which requires concentrated attention is to be carried on, the case is quite different. In a room that is to be used only for study and writing, the important requisites are that there shall be plenty of light, that it shall come from the proper quarter, preferably from the left hand, and that it shall not be too low. These conditions secured, we should be inclined to say that between three feet and five, the latter was, on the whole, the better height for the window-sills in a schoolroom. The light that comes in below that level is not serviceable, and there is no reason for tempting either teachers or scholars to turn their attention out of doors. The limit, however, is one within which architectural effect may reasonably be allowed to rule. One would naturally infer that this was the determining consideration in the schoolhouse referred to. But whatever may have been the real justification of the singular resolution we have quoted, the reason given for it in the preamble is as apposite as if it had been recommended that whereas the ten chimneys on the Town Hall, serving twenty-five fireplaces, rose only twelve feet above the roof, while the six chimneys on the Court-House, serving only eighteen fireplaces, rose fifteen feet above its roof, therefore the six chimneys should be razeed to the height of the ten.

THE Brooklyn fire has already given being to a wholesome crop of municipal and legislative action throughout this country and abroad, and now the fruits of the Ashtabula disaster are making themselves known in a similar manner; and as in the first case, they are likely to mature to a good end, as public sympathy is still quick, and any measures which look to diminishing the dangers that beset our daily life will be sure of popular support. A bill has lately been introduced in the House of the Pennsylvania Legislature which will make it the duty of any corporation that has built or shall build in the Commonwealth of Pennsylvania any bridge for the passage of railroad trains, to file in the office of the Secretary of the Commonwealth and in the office of the Recorder of Deeds of the county in which the bridge is, within thirty days after the passage of the first train over such

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bridge, a copy of the specifications of the requirements which were to be met by the bridge, together with a copy of the strain-sheets showing the strains to which the different parts are to be subjected, and the sectional areas which are designed to sustain these strains. To these must be added copies of the working-drawings in accordance with which the bridge was built, and the sworn statement of the chief civil engineer, or, if in case there should be no such officer, the president of the road, declaring that the specifications, strain-sheets, and drawings accurately describe and represent the bridge as actually built. A penalty of twenty-five dollars a day is to be levied for each day elapsing after the thirty days of grace before all the requirements are complied with. We trust this bill will pass not only the Pennsylvania Legislature, but also be adopted by other States, but with the addition of a clause that shall make it obligatory to file similar drawings and specifications of any alterations that may in the future be made. But bridges are not the only structures of which such records should be kept. Mills, manufactories, and warehouses in which are employed large numbers of men and women need more of a guaranty than the approval of an ordinary building-inspector at the time of erection. At any rate, there is one way in which legislative authority may be usefully exercised; that is, by compelling owners of buildings that may be leased for mercantile purposes to insert in their leases a clause stating the weight that such buildings are calculated to sustain, and constraining the lessee to place such statement in places where it may be constantly before the eyes and minds of his employees.

NOT long ago a convention of Illinois stone-cutters was called, but never held, to see if means could not be found to restrain the State from employing convict-labor in cutting stone for the new State Capitol, as was lately explained by our Chicago correspondent: the call expressed it, restraining the State from employing "more than fifty convicts on one trade." There was some justice in this desire, because the State by so doing deprived more honest men of the work; but one of the penalties of civilization is the enforced support of the criminal classes by the honest, and it is evidently for the good of the greatest number that criminals should be as far as possible self-supporting, even though it may bear a little unfairly on the trades in which they are employed. If among the convicts employed on the stone-work for the Capitol, there were certain statesmen of the class of which William M. Tweed is a type, there would be a certain poetical justice in it. The grimmest piece of humor that we know of is the use that the English make of convict-labor in the construction of prisons. Very probably the convicts who are to occupy the prisons are not the ones who are employed to build them; for a foreknowledge that they were building their own cells would lead, in spite of all vigilance, to scamping the work with the hope that they were thereby favoring their chances of escape. Two English prisons have lately been built by convict-labor, — one at Borstal near Rochester, where "selected" prisoners in sixteen weeks had so far completed the building that forty cells were fit for use when the building was formally occupied as a prison: since that time cell-buildings have been built and nearly completed, so that the present capacity of the prison is about five hundred. The same system was employed in building the prison at Wormwood Scrubbs, which is to take the place of Milbank Prison. Free labor was employed only in building a boundary fence at Borstal and on certain temporary buildings at Wormwood Scrubbs, and even then the material had all been prepared by convict-labor. For the prisons themselves, the bricks were made and the stone dressed on the spot; the stone was quarried at Portland and Dartmoor; the iron castings made at Portland; and the carpenters', joiners', and blacksmiths' work done at Milbank and Chatham, — all by convict-labor.

THE present is a time of no little anxiety to the building-community in France, as it is now being discussed whether or not trades-unions shall be introduced. The movement was initiated by the Workingmen's Congress recently held at Paris, which resulted in the introduction in the National Assembly by M. Lockroy of a bill to abolish Article 291 of the Penal Code, which renders trades-unions illegal by declaring that no meeting of more than twenty persons can be held without a license obtained from the police. Heretofore the relations of employers to their employees have been fixed by *chambres syndicales*, which are committees of less than twenty men forming a sort of board of arbitration to which the workmen have recourse in case of dissatisfaction. We believe that this method has hitherto given satisfaction; and we regret that the more brutal if more popular manner of obtaining an end is likely to be substituted for it. It does not take much to excite a Frenchman to such a point as to be forgetful of his best interests; and once let a body of them go as far as English strikers have sometimes gone, and a long stride towards a revolution would have been taken. It would be interesting, however, to see what part government would play in strikes, as for instance, a general strike of locomotive engineers.

ARCHITECTURAL STUDENTS. — IX.

RENDERING.

THE architectural student is not to think that when he has learned to represent with fidelity whatever he may have to draw, he has got all the capability he needs: in fact, the temptation to picture-making in one way or another is sure to beset him almost from the first moment he takes his pen or his brush in hand. It might be thought, perhaps, that encouragement of this tendency was altogether undesirable, and that the only thing to do was to lift the voice of warning against it. Nevertheless, in spite of the temptation which it offers to rely on effects that belong to a drawing rather than to the design it represents, and the abuses to which it is liable in competitions, the study of artistic effect in rendering — whether or no it is of any value to the public in whose behalf it is employed, and on whom it often imposes, as must be confessed — is certainly of much value to the architect who practises it. For it not only illustrates his design by a reflected light, as it were, but is itself, if done seriously and honestly, one of the very best means of training in him the sense of unity of effect which is the essence of the designer's skill. We are not writing, be it remembered, for the benefit of those who wish to learn to cajole clients and committees by clever tricks of execution, but for those who wish to cultivate their artistic sense on all sides as thoroughly as possible.

Eclecticism in design brings the danger of losing the feeling of unity in the multitude and discrepancy of the elements which it tries to combine. Now nothing helps this feeling more than the careful study of the *ensemble* of a drawing, — that is, than picture-making in the right sense; and nothing shows the weakness of a certain class of draughtsmen, far too numerous, than their incapacity to see how one part of a drawing or design affects another, or how all parts may unite in general effect. It is not enough even for the right representation of an architectural design, that each detail should be drawn with precision, and that the outline and perspective of the masses should be correct. The effect of the design as represented may depend very much upon the way in which this or that feature tells in it, upon the prominence or subordination of this or that detail, upon the predominance in force of one line over another, or the contrast between the repose of one surface with the animation of its neighbor. Many a design is thrown hopelessly out of adjustment in its rendering by the inefficiency with which some important element in it is set forth, or the harshness with which another is thrust into prominence. This rendering ought to serve not only for the information of the client or the public, but for indication to the architect of the effect to be aimed at or the dangers to be avoided in carrying out his design, and of the technical means by which it can be modified as he wishes it. A failure in this is apart from the other serious faults of bad textures, ill-balanced shadows, injurious accessories, unmeaning lines put in with a false notion of effect, and the hundred shallow tricks of which poor draughtsmen avail themselves to make what they think a good picture.

Examples are worth more to the student than maxims, and we advise him to study a good variety of them. Luckily there is abundance to be had. We advise him not to be content with the habit of work of the office in which he may be, but to learn the ways which accomplished men have

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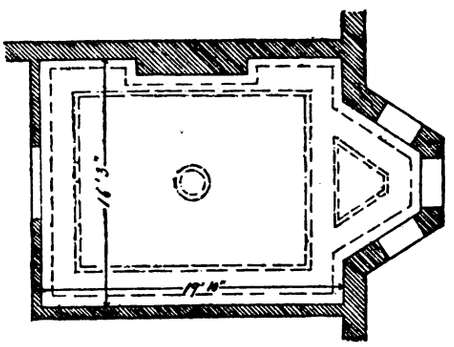
devised, choosing good examples and copying them as faithfully as possible, yet with regard rather to the general effects and character of the work than to such small tricks of execution as may usually be detected in them. It is well, by the way, for the student to remember in this, as in all copying, that the value of the copying depends on understanding the meaning of the thing that is to be copied. Every artist's drawing is in some degree an interpretation; and to know the value of an interpretation, it is indispensable to have some knowledge of the original. Therefore it is decidedly not best for the student to go in search of examples of rendering till he is practised in drawing, pure and simple. If he finds, as he will find in the work of good draughtsmen, that the architectural work is supported by cleverly drawn accessories, and if he wishes to make use of the like in his own work, he had best beware of depending on the drawings he copies for his knowledge of such accessories, but should make it a point to get studies of them directly from nature. Copying unguarded by knowledge will prove futile, for the copyist will not know what is significant and what accidental or unimportant in his model. A spiteful Nemesis seems to pursue persons who set themselves to save trouble by picking up their special knowledge at second hand; and drives them to persistently take things by the wrong end, like people who undertake to ornament their conversation with quotations from a language they do not understand. So we constantly see draughtsmen who ignorantly spot their drawings with tricks of handling that they have caught from cleverer workmen without comprehending the effects for which they were contrived, and use like Mrs. Malaprop's epitaphs. A familiar instance of this is a trick of which we have lately seen too many examples among pen-and-ink draughtsmen, — of thrusting in here and there, now into the light and now into shadow, a stout bundle of diagonal lines which mean absolutely nothing, and only break up the light or shade with a harsh and disagreeable spot. It is evidently a survival of the traditional way of indicating the slanting fall of light in an illuminated interior, or of some adventurous draughtsman's effect of sunlight breaking through clouds. One need not spend much time in turning over our own pages to come upon instances of similar faults. When the student has drawn an object carefully from nature, he will be in some condition to recognize the quality of another's representation of it, and to learn what may be learned from studying that representation. He will also be able to distinguish mere tricks of manner from significant indications of form and effect, and will be set on his guard against charlatanry, so that he may share the profits and shun the dangers of copying.

When in our last paper we advised the draughtsman to study variety of subject, we reminded him that variety of treatment was to be desired. It might surprise many draughtsmen to have to take account of their stock in trade, and find with how few methods of handling they are provided; how few kinds and combinations of lines, for instance, if they are pen-draughtsmen, they have at command. A new object to draw, or an unusual texture to express, finds them without any means to meet the difficulty. If the tricks of line by which they are used to indicate a brick wall or a stone wall or a slated roof will not serve, or if they have to change the pen for the brush, they are helpless. To acquire the necessary resources they must go out of their rut, must make studies of many things, and complement them by the study of different masters. In fact, it will be found that not only diversity of subject, but diversity of expression, requires diversity in rendering. A brilliant design calls for vivacious handling; a simple and quiet one, a correspondingly quiet treatment. A Gothic and a classic design may be suited best by quite different styles of rendering. We have before noted the fact that pen-drawing was preferred where Gothic design was in the ascendant, and the brush by designers of classic tendency. The brilliancy of the one mode of drawing and the breadth of the other find their corresponding qualities in the two kinds of design. And so with geometrical elevations or perspectives. The first are more formal, and invite a more conventional treatment: the second lead by an inevitable association to greater freedom and naturalism. To see an elevation handled with the free handling and the naturalistic accessories that would become a perspective, is always distasteful; and to import into a perspective the rigidity of line that belongs to an elevation, is almost as much so. The mediæval figure that we see standing with his measuring-rod in M. Viollet-Le-Duc's daintily conventionalized sections and elevations looks in keeping with his *entourage;* but thrust him into the perspective of a modern English design, and the most pronounced mediævalism in the architecture does not make him look at home. The styles of drawing which are characteristic of the French and English architectural schools may be taken, indeed, to represent two very different, almost opposite manners, — the one rigorously conventional, the other free and naturalistic; the one developed in a period of classical training, the other of mediæval. The student should make it a point to study, if possible, models of both; for he will find most valuable instruction in each. Of this, and of the use of special examples, we shall speak more at length in our next paper.

STUDIES OF INTERIOR DECORATION.

II.

THIS is the plan of a small parlor in a town house, which has lately been made the subject of decorative treatment.



The bay-window faces the north, and the height of the room is eleven and a half feet. When presented for study, this room had never been occupied; its walls and ceiling were of bare plaster; the base-moulding, architraves, and doors were of white painted pine. It had a large white marble chimney-piece, a stucco-moulded cornice too heavy for the room, and a small moulding in the ceiling dividing it into border and a central panel, with a cast centre-piece.

The room is with reasonable economy to be completed for use as a parlor for the lady of the house and her guests. It is to be fitted to receive a small collection of books and paintings, certain articles of upholstery covered with a rich gray-green figured plush, and a large Persian rug. It is desired that the new furniture to be provided for the room shall be of some light wood. As for the house itself, whatever of architectural character it may have as a whole is due to the inspiration of the Renaissance, but the style is treated without any especial aim at purity.

These are the conditions of the problem. It has been selected for our first study because it is of such a character as to give occasion for the introduction and discussion of several principles of universal application.

In the beginning it is evident, if the matter is worthy of any consideration by intelligent beings, that we must look for *a reasonable starting-point*, and develop our scheme from that point in a reasonable way, conforming always to the essential conditions as originally presented. We must do nothing from mere caprice; we must distrust all the allurements of fashion as well as our own instinctive tendencies for this or that form, style, or color, until they shall have been found exactly applicable to the case in hand. We must begin with self-denial, and endeavor to discover in the subject itself its own capacities for expression.

First, as to the walls. They cannot be very far from the eye at any point of observation; they confront one at every turn, and there is an unusual amount of unoccupied space in them. These therefore, their treatment and furniture, are the first points to be considered. If the room were larger, the ceiling would compete for predominance; if it were smaller, the necessary doors and windows would crowd upon the scene, and absorb our attention. Now it is evident that these walls must by brightness and glow be made to compensate for the absence of sunlight; and, as the apartment is one of luxury, they must be full of elegant detail of shape and color. But as the room is to be fitted for furniture in some light-colored wood, and to be decorated with a few paintings in gold frames, vases, plates of faience, objects of bright metal, these must be provided with a neutral background; our walls therefore, without losing the characteristics above noted, should be so treated as not to come in competition with the objects which are to be placed against them. This implies a certain gravity and reserve, an absence of self-assertion. But the general effect aimed at is not one of repose but of animation, with a harmony made up of many elements.

These conditions cannot be met by any uniform treatment of the whole surface. They are in themselves contradictory, and imply

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such a division of the walls as will enable us to place in one all the necessary elements of brightness, gayety, and movement, in the other all those which are grave, neutral, and retiring. This is the key to the perfect adaptation of these walls to the uses of the room. It is the logical starting-point of our study of decoration.

Inasmuch as we must at present necessarily exclude from consideration subject or ornamental hand painting on the ground of expense, though by this means all the conditions of design would of course be fulfilled more exactly and with the greater artistic feeling, we must needs have recourse to such choice as we can exercise among wall-papers. The fertility of modern designers and the restless enterprise of the trade have given us happily in this respect the largest scope, covering not only considerations of outline and color, but certain distinctions of surface obtained by glazes, embossing, or sizings charged with felt. But the very largeness of the scope, and the natural tendency in the production of wall-papers to develop into certain "styles" or fashions, are very grave elements of danger. Undisciplined taste selects a design pleasing in itself, but fatal when applied to the walls, or availing itself of the usual resource of timid but refined people, meets the emergency with pale and expressionless tones which neither shock nor please; and the precious opportunity for the creation of a beautiful result goes by unrecognized and unused. On the other hand, the disciplined taste, having in view the necessity of obtaining a certain definite effect, rarely finds even in the largest and best-selected stock of wall-papers the exact combination of forms and colors by which this effect is to be most directly realized, but is obliged to reach it indirectly by a judicious compromise with the nearest available choice, compensating for its defects or shortcomings by contrasts of other papers, with which he makes up with more or less success a composition of style and panel, or screen and frieze, in such relative quantities as his subject will admit. This limitation of choice not unfrequently gives occasion to a certain hardihood of combination which goes far towards compensating for the loss of the absolute ideal.

In the case in point we have discovered that two expressions are required on the walls, — the one brilliant, the other sober, — and that for these there must be provided two separate divisions. It is evident that as the latter element is to furnish a background, it should occupy the greater part of the wall-space continuously, and form a screen around the room. The line of division therefore, as the height of the room is sufficient to admit it, must be horizontal. The belt which has the brightness and movement essential to the effect of elegance and animation must be above the neutral screen, and serve as a frieze under the cornice. The natural position of the dividing line is given by the height of the doorway. To meet the conditions the screen should present a general warm, neutral effect, the pattern being equally distributed over the space, enriching it but not crying out for attention. Cold tints in quantities should be avoided, as the room needs warmth. To form the necessary contrast with the frieze there should be no movement, no dancing or twining of lines or figures on this surface, but a formal diaper, or a regular recurrence of conventional figures, spaced at intervals not exceeding six or eight inches. Light browns may prevail with serious contrasts of brown-reds or neutral buffs, the figures having dark brown outlines, and no gold. For it is to be observed that a rich neutral effect is best obtained, in art as in nature, by a judicious combination or bloom of many low-toned colors, rather than by any one tint, however soft and warm in itself, or by any combination of two such tints. To rescue the room from an effect of sobriety which would be incompatible with its uses, the frieze needs to be occupied with a bright movement of figures upon a field of warm buff and gold. The line of division between these two features should be enforced with a broad and flat wood moulding, light, like the proposed new furniture, but with dead black edges and a heavy gold picture-rod under. We have ventured in Plate I. figs. 1 and 2, to indicate certain combinations consistent with the requirements here set forth.

With these effects in our mind, we turn over the available stock of paper-hangings, and discover that the nearest approach to our neutral background is in a paper having branches and leaves of a dark olive tint upon a background of light olive, interspersed with clusters of flowers in the low-toned golden-browns and brown-reds which we sought for. For the frieze we find a design in which there is a succession of brown vases or *tazzas*, about thirty inches apart, holding plants with rugged brown branches flowering in bright yellow, with buds and leaves of positive green, the whole having black outlines, and interlacing over a field of buff and gold: an excellent composition, sufficiently rich and full of gayety.

But these, when put together, do not realize the ideal which we have developed from the subject. The screen has too much movement of figures. In this respect it competes unhappily with the frieze, and suggests the propriety of a contrast in the latter by dividing it into a series of square panels with a separate subject in each. The requisite designs not being found in stock for this purpose, we endeavor to effect the same object by establishing on the lower part of our wall surface several firm, strongly marked horizontal lines of color. Again, our new screen has a general tone of cool olive which does not give the expression of hospitable warmth which our conditions require, although it has scattered over it certain low-toned brown-red clusters of flowers. The floor is to be covered with a rich red Persian rug. We may reconcile these two reds and "marry" the wall to the floor by occupying this new dado space with a dark red figured flock paper having a texture and tone similar to the carpet. Above this a narrow belt of *bright red*, with its dividing black-bordered wood mouldings and bead of gold, compensates for the coolness and neutralizes the movement of the screen-surface, and gives a certain boldness and character to the wall treatment. Plate I., fig. 3, explains the treatment thus adopted, giving, so far as black and white can do it, the relative values of the tones and movements in these three divisions. At the top there is lightness, gayety, and movement; at the bottom there is weight, warmth, and strength of color; between them is the broad, quiet neutral space, in itself incomplete until two or three gold-framed pictures and sconces, a few plates of enamelled pottery perhaps, and the light wood which is to form the wall furniture, shall have been set against it. Each spot of accidental or local color in the furniture, books, and other movable fittings will fall naturally into place and give the desired result of quiet elegance.

The constructional woodwork of the room is made as little obtrusive as possible by treating it with the low-toned colors of the screen surface, using the brown-red in the panels.

Thus in developing a consistent method of decorating these walls, it is to be noted, first, that we have established an ideal treatment, and second, that, on account of certain compromises we have been obliged to admit, there has resulted a treatment which in detail is very different from our ideal. But in spirit, in sentiment, the two treatments are identical. Indeed, any given effect or ideal of decoration may be expressed with an infinite variation of design. Therefore the main point is to fix upon the ideal effect, not by caprice or in subservience to a fashion, but by processes of reasoning, and then with such means or with such "study of imagination" as we have at command, to give loyal expression to it.

This is the way in which we have endeavored to meet the condition of the problem as to the walls; we shall presently treat of the ceiling and furniture. H. V. B.

THE ILLUSTRATIONS.

COMPETITIVE DESIGNS FOR THE TOWN LIBRARY, WOBURN, MASS. MESSRS. CUMMINGS AND SEARS, ARCHITECTS.

(9 Pemberton Square, Boston, Mass.)

COUNTRY HOUSE, WELLESLEY, MASS. MR. JOHN A. FOX, ARCHITECT.

(12 Post-Office Square, Boston, Mass.)

THIS house was completed during the past year. Although planned for summer occupancy chiefly, it is built in the most thorough manner. Most of the inside finish is in ash. There are soapstone fireplaces for open wood fires, with marble mantels, in nine rooms. The attic is finished into rooms, and is nearly the same in plan as the second floor. The roof is covered with purple Welsh slates, and the gable with red Vermont. The outside work is painted in buff, white, and gray tints, the blinds being a very dark green. The house stands on a knoll, in a horse-shoe bend of the Charles River, in the midst of a group of five fine old elm-trees. The two largest trees are omitted in the drawing in order to show the building.

STUDIES OF INTERIOR DECORATION. MR. HENRY VAN BRUNT.

(2 Pemberton Square, Boston, Mass.)

See preceding article.

RELATIONS AND POINTS OF CONTACT BETWEEN THE ARTS.

A PAPER BY PROF. WEIR OF YALE COLLEGE

READ BEFORE THE NEW YORK CHAPTER A. I. A. FEB. 22, 1877.

WHILE I am sensible of the honor you have conferred upon me by inviting me to address your Chapter of architects on this occasion, I trust I have the good sense to discern that this is a mere act of courtesy; for it could hardly be expected that I should appear before this professional body either as a teacher or a critic of art. It is simply as a student of a kindred art, that I venture to respond to this invitation by offering some suggestions that may be of mutual interest, respecting the relations and points of contact between the arts.

Some years since, in Venice, I was standing with a sculptor of distinction before a large picture by Paul Veronese. The background of this picture was occupied with stately architectural forms interspersed with statues. To these statues I directed the sculptor's attention, with the remark that they were "well designed," — "Yes," he replied, "but evidently by a painter;" and indeed I apprehended his meaning at once, for I saw at a glance

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that they were not sculpturesque figures at all, but picturesque. And I dare say, if the architecture which filled the background of that noble picture with such admirable effect were submitted to the critical eye of an architect, he would term it "painter's architecture."

We all agree that the arts have their respective ends in view, and these ends are not only distinct, but this distinction constitutes the distinguishing merit of each separate art. This incident I have cited may suggest that it is natural for us to view all things through the accustomed medium of some specialty from the influence of which we cannot escape.

If, therefore, I should seem to view the themes I am about to discuss, from a picturesque rather than an architectural standpoint, you will understand that this is in accordance with the habit and constitution of my artistic vision.

The outlook upon one art from the domain of another is always an attractive one. We see results in the absence of tedious methods; and these results, in all the arts, have points in common, — something that appeals widely to a universal art instinct, while the absence of labor and process leaves the mind free to the simple enjoyment of the result.

The painter, fresh from the complex methods of his own art, may deem the practice of the sculptor a very simple one. He enjoys too the reality of form in the statue, in lieu of its mere resemblance in the picture; for one may walk round it, touch it; there is no eluding subtility of color, no evanescence of light or shade, to be sought and evolved. The sculptor viewing the finished picture might as readily deem the painter's practice far lighter than his own. And these artists looking upon the completed work of the architect might in a similar strain fancy its elements of design, construction, and the nature of the materials employed, to be far less complex as a means of art than those human elements of form, action, and expression, to which their own arts are so strictly subservient. The architect perhaps will not escape a similar view of disparagement of all other arts in comparison with his own.

But these are superficial estimates which the true artist is not likely to apply. The poet, the sculptor, the architect, the painter, are all properly comprehended in the term artist. Goethe applied this term to himself, deeming his work to be that of an artist. Yet one may be an architect, a sculptor, a painter, and not an artist; as one may be a verse-maker, and a rhymer, though not a poet.

All the arts have points in common; their paths lie through different methods; but they all appeal eventually to those tastes and sympathies that are common to man. The artist labors, not merely for the approval of those within the narrow limits of his own profession, but for that wide and general approval which constitutes fame. Art is not for artists alone, but for man.

The various subdivisions of art — as sculpture, architecture, and painting — seem each to give special emphasis to some one particular æsthetic element above the rest. In sculpture, form predominates; in architecture, proportion; and in painting, *chiaroscuro*. These of course are not ends, but means; but in judging of the purity of an art, we estimate it as the Greeks did, with reference to its reliance upon its appropriate elements for its first expression of beauty. That is, in good sculpture there is no recognized substitute for beauty of form. There are no tricks of art by which the statue can be made to appear beautiful while in form it is not so. And in architecture critically considered, I believe you will agree with me, a badly proportioned structure cannot be decorated into a fine work of art, nor can a picture that is deficient in its *chiaroscuro* be rightly considered admirable as a painting, and when one art lays hold of another to increase its effect, it runs the risk of either compromising its boundaries, or suggesting its own shortcomings; especially will this be the case when the aid it thus receives usurps the first place. We all agree that the art must not be sacrificed to its accessories. It is therefore unreasonable to conceive that any art should discover its prime element in a mere matter of detail, as Mr. Ruskin has insisted that architecture is only properly to be considered a *fine* art with respect to ornament. Professional architects, I believe, ridicule this notion, just as painters ridicule his notion that the mere elaborate imitation of nature constitutes art. But it is through these parallel and diverging interests in the arts that we are sometimes enabled to arrive at general principles. There are points where they all blend in satisfying and pleasing the senses, without one questioning the nature of the means through which their effects are produced. I have known more than one painter pause to admire the spire of Dr. Pott's church (or what was formerly so called), for though simple and unpretentious, it satisfies a painter's eye: it is harmonious and picturesque.

The first two points I would discuss are these: Does the profession of art in any of its branches, gain or lose through modern specialism? And does not this specialism tend to suppress the artistic aim, and exalt to the first place technical methods? Every one is familiar with this broad distinction between artists of the middle ages and those of modern times, viz., that the former were adepts in many arts, while the latter strictly adhere to some one art, or rather to some particular branch of some one art. This is notoriously the case in painting.

It seems to me that this specialism is not only narrowing in an artistic way, but it cramps and confines the sources of invention. Nor does it appear that technical methods in painting, or the science of construction in architecture, gain any respect from this exclusive adherence to a specialty. The old masters in painting, with all their diversity of aims, understood methods more thoroughly than we do to-day; and the architects of Greece and the middle ages understood construction with a scientific insight that has not since been approached. It is undoubtedly true that many examples may be cited of very faulty construction in mediæval architecture, though these instances are the exceptions, not the rule. But what is more, the mediæval builders understood construction so familiarly that they seemingly threw their work together with a certain nonchalance or apparent disdain, as though consciously superior to it by readiness of resource and invention. They were no less mighty in their gambols than in their labors. They treated their materials and their masses in subordination to artistic or expressive effects.

But there is another merit to this mediæval diversity which is lost to modern specialism; it compelled a thorough groundwork of general principles common to all the arts. This enabled the old masters to pass freely from the practice of one art to that of another, as Giotto, Brunelleschi, and Michael Angelo did. At the root of these common principles lay the discipline afforded by the study of the human form. This discipline may appear to be a remote one for the architect. Yet as a discipline, as a means of awakening a sense of form, of proportion, and of those values arising from the relation of the parts to the whole, or of their proper subordination to the latter, it afforded the best education for those æsthetic faculties which properly constitute the artist; for there is no other object that unites in so high a degree of beauty the requisite elements for disciplining the art faculty. Vitruvius, Brunelleschi, and Michael Angelo all insisted on the study of the human form, particularly of its anatomy, as part of the necessary discipline of the architect. And I think I may safely affirm that for the most part the greatest examples of architecture that were produced from the thirteenth to the sixteenth centuries inclusive, in Italy and France, were the work of architects who had studied the human form as painters or sculptors.

Every well-trained painter formerly began his discipline by the study of sculpture, and every well-trained sculptor by at least acquiring the element of drawing; and if we are to accept the testimony of many of the most famous masters of the later middle age, every well-trained architect by acquiring a knowledge of both painting and sculpture was the better fitted for the practice of his art. You may remember the richly ornamented entrances to the cathedral of Siena, flanked on either hand with clustered shafts sculptured with varied traceries. A closer examination of these traceries and running arabesques continued up the shafts and following the jambs shows a ceaseless and occasionally very eccentric variation in design, as though the artist allowed his fancy to free itself whenever his task grew dull, and this without reference to those over-nice symmetries that easily become monotonous, as when invention subsides into mere reiterations. Such variations in ornament have for us the pleasing surprises that a change of key in music affords. When we think we have seen all, we find unexpectedly that we have seen but the smallest part. When we discover this individuality, this freedom, this humanity that even a slight ornament may be made capable of expressing, as at Siena, we easily admire such art.

Much of the interest and charm of Gothic architecture is certainly derived from the character and beauty of its associative sculptures. It follows therefore that the old architects must have been, in feeling, sculptors as well. And shall we not say the same thing of their evident sympathy with the picturesque? It is, I fancy, in some respects a test of good architecture, that it invites the other arts to do it homage; that the poet and the painter, after the fashion of their arts, delight in its beauty, for to the former its stones have voices, to the latter a dumb but expressive charm.

It is not alone in such oriental richness of color as may be seen at San Marco and Venice, that the old architect proved himself to be in sentiment a painter also, but those vast and solemn depths of shadow that lie ingulfed in the great interior spaces of the Gothic cathedrals, and that contending struggle of the irruptive light, — pouring through the lofty windows in triumphal splendor, or the dim, feeble ray now resting with stained hue upon a foliated capital, or dying away in gloom, — suggest a more than common feeling for the highest value of *chiaroscuro*.

As architecture therefore is an art which in its highest demands unites with it whatever the other arts are capable of contributing, it seems to me that the architect cannot escape the necessity of some personal knowledge of the spirit and substance of these arts. It barely meets the question to reply that the architect may call in the assistance of the sculptor where it is needed, or, when he has constructed an edifice, he may call in the painter to decorate it. It is a question that concerns the construction of the edifice itself, in its ornamental details, and in the selection and application of color in the materials employed.

Leaving these imperfect suggestions, there is the second topic to be briefly touched upon, — whether excessive specialism does not tend to exalt the technical above the artistic or expressive in art.

I think it does, for it pushes to excess competition in mere tech-

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nical skill; not but that there is great merit in this, but is it not likely to absorb the attention, and all the energies as well, and so divert them from the higher ends of art? There is apt to be more skill but less feeling; more technical display, but less expression, of things that cry out to be expressed. We laymen can recall little of that skill in construction, which the architect very properly delights to dwell upon, in our memories of Chartres, Rouen, Amiens, and Cologne cathedrals, or of the domes of Florence and Rome; but we do recall and fondly dwell upon those lasting impressions that overawed the mind. And surely it is not of the truth of its anatomy we think when the sculptured form of "Laocoön" is present in the memory; nor do we recall the means and implements of his art when the eyes of Titian's "La Bella Donna" speak to us so eloquently from the canvas. No! the true power of art does not lie in technical methods. It is better to emulate the pride and aspiration of the people of Beauvais (was it?) who built their cathedral spire so high that it tumbled down, than not to aspire at all.

A too exclusive adherence to a specialty deprives the æsthetic sense of the benefits that occasional excursions in other fields afford. So far as invention is concerned, an old well-worked vein in art can only produce reassemblages of old forms, that mimic something which is inimitable.

It is the power of putting one's individuality into a thing that gives it life and interest. This was the power that lay at the root of those great works we admire so freely in all the arts.

It is related of Brunelleschi that when arguing before the syndics of Florence, in favor of his plan for crowning the cathedral with its vast cupola, he was denounced as a madman, and the syndics treated his proposals as extravagant and absurd; whereupon the architect boldly denounced the ignorance that was placed in competition with his own long and patient preparation for the task — a preparation of more than twenty years of unremitting study of art, and more particularly of the plan he was advocating, and which he had perfected upon the basis of a most careful study of all the arches of antiquity, and of all the methods of building, clamping, vaulting, and so on — to that degree of thoroughness that he exclaimed, "I, who in my own mind see the cupola raised, have reflected on all these things;" and the visitor at Florence looking upon that great dome, — the greatest in the world, I believe, — may recall those words of George Eliot in "Romola," that it had once been only a daring *thought* in the mind of a small quick-eyed man, the son of a notary.

I dare say the reflection has already been anticipated in your minds, that these considerations are all very far removed from the immediate and practical ends that are attainable in art to-day. They may or they may not be so remote. But if they be, I should only the more desire to confine myself to them. What is termed "the practical" will take care of itself very well; for it has an advocate in every brick, and from the hod-carrier up to the master-builder, its arguments are fortified by the strongest facts which none may gainsay. But Mr. Emerson has well remarked, "When first wants are satisfied, then the higher wants become imperative."

The architect, no less than the painter or the sculptor, secures a friend or a persistent enemy in the observer whose eye is filled, in passing, with the image of his art. For the sensibility fortified by knowledge is after all the final and universal test in such matters; and while an acquaintance with its *technique* greatly enhances the appreciation of a work of art, it is by no means the first essential requisite to this end.

Instances are not wanting where the architect with adequate ability for better things has been reduced to merely lending his skill in the mere elements of his art, to embody the absurdities of an altogether inadequate conception on the part of his client.

The impression likewise has been sometimes entertained on the part of the ignorant, that if the architect were allowed more liberty, he might lose his moral sense of responsibility with respect to space, time, and money; but it may be safely affirmed that as all true art has its own strict economies, and the most beautiful thing is also the best adapted to the place and function it serves, there is true economy in the employment of a good architect, and in allowing him to exercise his own invention, which should properly be held superior to any one's else.

There is but one suggestion I would add before closing my remarks, and this is with respect to what professional practitioners might do for art, as is done in every other profession, if they would themselves instruct the public upon those subjects to which they have given both study and reflection united with practice, instead of leaving the every-day criticism of art to pseudo-critics and mere writers, to whom we are indebted for that mild *pabulum* which not merely has no substance whatever, but rather nourishes to the decay and death of all genuine sympathy for art, and blights so far as it is able the enthusiasm of those who should be stimulated and encouraged to the highest effort. A keen and serviceable criticism in art is altogether lacking in this country, while artists themselves neglect the learning of their art, and subside within the exclusive limits of its practice. Do they not run some risk of elevating the technical above the intellectual, and so of becoming skilled artisans rather than true artists? A singular prejudice seems to have existed in the mind of some people, artists as well, that learning in art is prejudicial to its practice, or that it is not the province of an artist to talk about his art. Even Sir Joshua Reynolds falls into this error in theory, for he says a painter should sew up his mouth, meaning that he should rely solely upon his art as the legitimate means for expressing his ideas. But the worthy Sir Joshua appears to have overlooked the fact that his own famous discourses were a conspicuous refutation of this narrow charge.

One cannot put too high an estimate upon the power of architecture to impress human sensibility and inspire profound thought. If any one doubts this, let him make a pilgrimage to its shrines. It is an art which in its most exalted forms gathers within its vast limits all other arts, which are made tributary to its sublime and solemn ends.

In enumerating the necessary qualifications both of an artistic and scientific kind demanded by an art so complex and yet so practical as architecture, one is likely to exclaim as did Rasselas on learning what were the necessary qualifications of a poet. "Enough," he says, "for you have convinced me that no man can be a poet." And when we reflect upon the variety of knowledge that is requisite for the thorough practice of this art, we may well repeat the phrase slightly altered, that no man can be an architect. And indeed, turning the eye upon many of those marvellous structures that were erected in ancient and mediæval times, — structures which elicit unspeakable admiration, and yet to which the name of no architect is attached, so uncertain is fame, — we are about led to imagine that they must have grown up stone by stone, the petrified aspiration of a time or people, and not the creation of an individual mind.

[We regret that want of space has obliged us to slightly condense Prof. Weir's paper. — ED. AMERICAN ARCHITECT.]

BOOK NOTICES.

ELEMENTARY ARCHITECTURE.[1]

IT cannot be said that the text with which Mr. Krusi has prefaced his own numbers of his elementary drawing-books adds any charm to them; yet it might have been better if Prof. Babcock had prefixed fuller directions to those (the architectural series) which he has prepared. They might be the means of conveying considerable information to the uninstructed student; but the descriptions are very slight, and give little account of the way of making the drawings or of their characteristics. As they stand they are merely examples to be copied with measuring-strip and dividers, although the scales are recorded in the text. Nevertheless the student will be likely to get as much instruction in drawing them as he would get from the same sort of work in offices, with the advantage of having a better selection of forms before him than he would be likely to find in an average office.

The examples given in the numbers which we have received comprise a variety of scale-drawings of architectural and structural detail, — two or three orders, vaults, Gothic features and mouldings, and a set of working plans for a frame house of a common type. The selection grows more interesting with successive numbers. It would be an advantage if the student were informed where the examples were taken from, — the Gothic windows in No. IX. for instance, — and if a note were given here and there to call attention to any significant peculiarity. We do not believe in introducing such a roof-truss as is given in plate 5 of Part IX.; satisfactory in idea, but constructed on a system that is fortunately become obsolete, among American constructors at least. If executed in any of the ordinary materials and put together as here shown, it would soon sag enough through compression of the heads of the king and queen posts by the thrust of the rafters to throw the rather complicated system of braces out of their bearings.

ARCHITECTURAL SURVEYORS' HANDBOOK.[2]

As in this country we do not have such persons as clerks of works, architectural surveyors, and quantity surveyors, the necessary data for compiling a book precisely similar to Hurst's Architectural Surveyors' Handbook, could not be arrived at. Nevertheless that portion of the Handbook which constitutes its distinguishing feature — the measurement of builders' work — is of value, in spite of the drawback of its being based on English uses, and employing English trade terms.

The tenth edition of this compact little work is now put forth, revised and enlarged. Besides the usual formulæ and tables of strains, strength, weight, etc., a great deal of useful information is given on water-supply, pumps, drains, gas-supply, walls, arches, and piers, on heating, ventilation, mensuration, etc.; and among other things a very curious table of the constants of labor, wherein is set down the fraction of a day consumed by craftsmen and laborers in performing almost all varieties of work, — for example, in picking up and stacking a thousand bricks without moving, a bricklayer consumes .2 of a day; while for selecting a thousand bricks for facings, .3 is required.

[1] Krusi's Industrial Drawing: Elementary Architecture. By Charles Babcock. Professor of Architecture in Cornell University. New York: D. Appleton & Co. Parts I.-IX.

[2] A Handbook of Formulæ, Tables, and Memoranda for Architectural Surveyors and Others engaged in Building. By John Thomas Hurst, C. E. Published by E. and F. N. Spon, London and New York.

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Not having a copy of an earlier edition by us, we cannot say wherein the present edition differs from its foregoers. Typographically, as well as in arrangement and classification, it is admirable, as in spite of the compactness of the work, the pages present an open and fair appearance, allowing the eye to seize at once the more important things on the page before it. The book is well indexed, cross-references are given, and authorities are cited in a very satisfactory manner; but a table of contents — a thing of importance equal to that of the index — is not given. The value of some of the tables is lessened by their want of correlation, as one set of substances are used in one table, while in the next different substances are used. Together with much information that is curious as well as valuable, there is some that is curious and practically valueless: as example of the first may be cited the fact that a speaking-tube measuring half a mile in length and making numerous bends has been found to work satisfactorily; as example of the latter, the fact that an elephant drinks about twenty-five gallons of water a day.

BOOKS RECEIVED.

A Plea for Art in the House. By W. J. Loftie. Illustrated. Porter & Coates, publishers, Philadelphia. Price $1.00.

Suggestions for House Decoration. By Rhoda and Agnes Garrett. Illustrated. Porter & Coates, publishers, Philadelphia. Price $1.00.

Applications of Physical Forces. By M. Amédée Guillemin. Published by Macmillan & Co., London and New York. Price $12.50.

DRAINAGE OF COUNTRY HOUSES.

NEW YORK.

EDITOR AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — I was much interested in the courteous responses of Col. Waring and Mr. Towne to my letter on the drainage of country houses, published in your issue of Feb. 3, and regret that I could not find time for an immediate reply.

I cannot wholly agree with Col. Waring's views respecting the absorptive and oxidizing power of the soil, without taking certain well-defined exceptions to his very general conclusions. A full discussion of the points at issue must be more appropriate to the columns of an agricultural journal than to one devoted to architecture; but as architecture and drainage are of necessity closely allied, the subject possesses a practical interest for a very large proportion of your readers.

In my judgment, formed after some observation, the adaptation of the soakage system to house drainage depends upon a variety of conditions, primarily upon the character of the soil. If I attach more importance to the action of vegetation than Col. Waring does, he attaches more importance to the powers of the soil and its contained oxygen than I do. In his communication published in your issue of Jan. 27, he speaks of the "concentrated oxygen of aërated earth." I have never found any satisfactory evidence of the fact that oxygen is concentrated in the soil. Oxidation is unquestionably promoted by looseness of the soil; but this same condition favors the escape of gases resulting from the decomposition of organic matter, and those most productive of disease are not, so far as I know, appropriated by vegetation. In assuming that the character of the soil is of secondary importance as concerns the efficiency of the soakage system, Col. Waring seems to contradict himself. Very little air permeates a stiff clay soil, as he practically admits. Heavy clay soils do not in themselves exert a stronger absorptive action than porous soils. The absorptive powers of clay are only manifest when it is finely divided, as when burned or intimately commingled with the looser components of a light loam.

The experiment of straining dung-liquor through soil does not prove much, if any thing, as regards the subject under consideration. The solid matter is simply removed by the ordinary proces of filtration, and under the combined influence of heat, moisture, and air, it would quickly ferment. That "organic matter once seized upon by the soil is never again given up in an unchanged condition," is not, I think, established. I know of one case where carrots planted in ground fertilized with material freshly removed from an old privy-vault, were wholly unfit for food. Washed clean and cut with a knife, they were unhealthy in appearance and offensive in smell. As to the "unyielding grip of the interior surfaces of the soil to prevent added organic matter from working downward," I fear there is some room for doubt. It is certainly difficult to reconcile the proposition with the fact that the roots of plants follow the deposition of organic matter, and, as in the deepened soil of the Mapes farm in New Jersey, extend to twice the depth usually reached by the roots of such plants in stiff soils, manifestly because the manure had worked down as the depth of the soil was increased.

There is a limit to the absorptive powers of every thing. Even charcoal has its limits, although its powers are to some extent self-renewing. So it is with the soil. When the surface is ice-bound there is little opportunity for aëration. If unfrozen below, it is likely to be sodden from preceding rains, and under such circumstances the destruction of upward matter by oxidation would proceed but slowly.

That sewage can be discharged into the soil continuously, without ultimately polluting it to considerable depths and beyond the reach of the oxidizing influence of the air, I cannot believe. It is no uncommon thing to find deep wells polluted by impurities carried down from the surface. The water of wells sunk near barnyards is often unfit for use, even when the danger of contamination by the inflow of unfiltered surface-water is effectually guarded against. On this point the experiments of Dr. Lissauer, as translated from *Deutsche Vierteljahrsschrift* in the Proceedings of the Institution of Civil Engineers, are not without interest. The results of fifty-one experiments to determine the absorptive power of soils point to the following conclusions, among others: —

"1. The liquid entering the pores of the soil displaces the air or liquid previously present, forcing the former upwards into the atmosphere, and the latter downwards into the subsoil or effluent water.

"2. In order that the effluent water may not be directly polluted by the sewage liquid, the maximum supply of the latter must not be more than can be taken up by the pores of the soil.

"3. Dry loamy soil absorbs more than peaty soil and gives up less, whilst dry sandy soil on the contrary absorbs less and gives up more. Consequently a loamy soil, though it absorbs a large quantity of liquid, can seldom be irrigated; whereas a sandy soil, though it absorb but little, may often be irrigated.

"4. The looser the soil, the easier water-courses are formed in it, and therefore the less can its maximum power of absorption be approached: otherwise the sewage liquid might penetrate the subsoil before the whole of the ground had been saturated.

"5. In order therefore that the effluent water may be protected from pollution, it is especially necessary that the absorptive power of the soil should be known; but the determination is of no value unless it be made in a sample in which the natural position of the particles of earth have been undisturbed."

I have no desire to place myself in a position of antagonism to the system favored and defended by Col. Waring in his several communications. I consider it good, but like all good things it probably has its limitations. It rests with the engineer and the architect to intelligently determine what these are.

In Mr. Towne's letter, I find some statements which indicate that he has reasoned from imperfect data. The consumption of water in cities is certainly no standard by which to judge the consumption per head in country houses depending upon wells and cisterns; and I refer him to Col. Waring's last letter for an estimate, which though very liberal is more nearly correct. As regards cesspool capacity it must, of course, depend somewhat upon circumstances. A nine-hundred-gallon capacity is by no means an arbitrary standard. Speaking generally, it is safe to say that the smaller the cesspool the better, inasmuch as it requires to be emptied the oftener. The conservation of filth under conditions favorable to the exercises of its power for mischief is never desirable. Eternal vigilance is the price of good health; and I have yet to see a drainage system applicable to isolated country houses, which can be left to take care of itself without sooner or later becoming a nuisance and a danger. I should never drain roofs or carry storm-water from any shedding surface into a cesspool which also received the house-waste, and the danger of overflow from this cause need not be taken into account. Respectfully,

J. C. BAYLES.

BOSTON.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

I have carefully followed the discussion in regard to house drainage between Messrs. Towne and Waring, and am forced to believe, from their accounts of "careful watching" and "satisfactory results," that their field of labor must have been in a climate far more mild than that of New England. They hint, indeed, at conditions of frozen ground; but the stubborn fact is that in this part of the country the soil is frozen to a depth of three to five feet, and for eight to twelve weeks at a time, except in unusually mild winters. Mr. Waring says that his "house-drain is only two feet deep, and has remained unaffected when the ground was frozen solid nearly five feet deep;" not at all surprising, if his range has a water-back, and his bath-tub is conscientiously exercised. But (and here is the question on which, not having experimented, I desire light) his flush-tank is outside the house, mainly above ground, with only an inch-board "dog-house" covering it. This would certainly allow the sewage to become cooled off in this climate. Now suppose his sub-irrigation pipes one foot below the surface of earth frozen four feet deep receive a flushing of this sewage twice a week for six weeks: first, how can the soil already frozen solid three feet below the pipes receive and absorb the liquid? and second, to how great a degree will it become aërated during the winter when the lawn is covered perhaps continuously with a foot or two of ice and snow?

During the six weeks which is assumed as no unusual duration of this state of things, on the accepted basis of calculation there will have been discharged into the pipes (and where thence?) 12,600 gallons of sewage.

Will not the aëration have to proceed with extraordinary rapidity to make up all this lost time, when the frost finally does leave the ground, and that at a time when the soil is ordinarily sodden with spring rains, and vegetation is still dormant?

Every intelligent person who has to do with house sanitation acknowledges, of course, the prime importance of this matter of sewage disposal on limited areas in the suburban districts; and I propose the following questions, with a view of eliciting further information: —

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As this letter is conceived in an interrogative mood, let me ask the advocates of Fludder's system of soil-pipes, how a current of air at a temperature averaging (say) 10° or 15° Fah. constantly descending a soil-pipe at a considerable velocity, would affect the water in connection with or near such pipe. About such an average temperature prevailed (say) from Dec. 1 to Jan. 15, 1877; and a thick iron pipe like a soil-pipe, kept at this temperature, and connected untrapped with the water-closet basins, would, it would seem, cause dangerous freezing, if not by conduction, at least by lowering sufficiently the temperature of the air beneath and around the closet-basin and supply-pipe. Further, with a thick iron pipe cooled down by a constant current of outside air at (say) 10°, would not cold water trickling down its inner surface be liable to congeal?

ZERO.

TRINITY CHURCH.

ROCHESTER, N.Y., Feb. 26, 1877.

EDITOR OF AMERICAN ARCHITECT AND BUILDING NEWS.

Sir, — The beautiful heliotype of the new Trinity Church in Boston which graced your impression of the 3d inst. seems to me to be quite a marked improvement on any thing in the line of building illustration which had preceded it, and so to deserve special notice and commendation. In your critical remarks on the church in the paper of the 17th inst. you call attention to "the grand mass of the tower" which is undoubtedly the most notable feature of the building; and it has occurred to me that it might be a kindness to "architectural students" as well as interesting to general readers to call attention to the fact that this tower is good because evidently studied in "mass" from the tower of the old Cathedral of Salamanca (A.D. 1200). This will strike any one who may happen to have Fergusson or Street handy and will refer to the illustration of that lantern.

A "study" for this same Boston tower was published in the New York Sketch-Book for August, 1874; but the design ultimately carried out is even more like the original than the study.

In nothing else perhaps is our church design so weak and meaningless as in its towers and spires; and this may possibly be owing to a striving after new forms and startling effects, a desire to be original even at the cost of being vulgar. There is a simple dignity and impressiveness about the mediæval forms and proportions which we cannot afford to neglect, and are not likely to improve. Just one regret remains in the mind after a long look at your representation of the new "Trinity," and that is, that the western towers and the proportion of the nave were not as carefully studied as the central tower.

C.

[The advantage of the mediæval builders was, that besides living in an age which had definite artistic aims and a well understood and fixed procedure for attaining them, they, as first comers, had the opportunity of appropriating the simple and natural forms that first suggest themselves for the purposes at which they aimed. They left to us who follow them the choice of using the same forms for the same uses, or taking refuge in others less natural and therefore less suitable and expressive, with the risk of being, as our correspondent says, original at the cost of being vulgar. No architect can afford to neglect the study of his predecessors' works, or of his contemporaries, for that matter. But there is studying and studying; and if a dozen architects were to study a tower from that of Salamanca, we should be interested to know how many of them attained a result on a par with that of the architects of Trinity Church. The Salamanca tower is octagonal, with a round turret relieved against each corner face. The central dormers of the Trinity tower are very like those at Salamanca and many others, but the treatment of the curtain below, which is studied with great skill, is very different. — *Ed. American Architect.*]

HOW MORE THAN FIVE PER CENT MAY BE PAID.

ABOUT January, 1875, a certain church in Boston then intending to build a new edifice invited five architects to compete; a subcommittee from the general committee was appointed to wait upon three of the competing architects, and make with either the best bargain they could. One squarely said his charge would be five per cent on the cost; another named a fixed sum; and the third, who happened to have submitted the most satisfactory design, agreed to make the drawings and partially superintend (or supervise) the work for $1,000. The cost of the church was to be about $60,000.

Later, on account of some internal dissensions, the committee was changed, and another architect employed, and the architect with whom the earlier committee had contracted was dropped, not discharged or settled with. The following is the actual result.

Architect employed, 2½% for general drawings and specifications.	$1,500 00
Same for detail drawings 1%	600 00
Local superintendence by one of the competing architects	500 00
Amount awarded by jury to architect dropped	761 24
Cost of court, etc. (said to be)	500 00
	$3,861 24

Members of the committee under oath stated that the building cost a trifle less than $60,000.

T.

NOTES AND CLIPPINGS.

BROOKLYN'S NEW CATHOLIC CATHEDRAL. — Bishop Loughlin of Brooklyn has determined that the long-suspended work on the new Cathedral shall be resumed this spring, and has notified the architect, Mr. William S. Kieley, to make arrangements for the work. The structure, which was commenced about ten years ago, is bounded by Vanderbilt, Greene, Lafayette, and Clermont Avenues. It has been finished to the first floor only. The edifice, which will be one of the finest in the United States, will cost upward of a million of dollars. The progress of the work will have to be regulated by the amount of funds available therefor. There is sufficient money now on hand, it is believed, to continue the mason-work during the spring and summer.

AN IMPROVEMENT IN ELEVATORS. An elevator in a San Francisco hotel has an attachment by which the doors at the different landings are opened and shut at the proper moment: this is effected not as in some cases, by the car pressing against a lever in its rise, but by a separate piece of mechanism independent of the car, which is regulated in the engine-room below.

THE CHICAGO COURT-HOUSE. — Work has begun on the Chicago Court-House two weeks earlier than was expected.

AN ILLUMINATED CROSS. — The cross upon the new St. Augustine's Chapel, on Houston Street, New York, is to be illuminated by night.

SCAMPING. — The town of Westfield, Mass., built four years ago, under the direction of an architect, a schoolhouse for $36,000. The work was so thoroughly scamped throughout that the building is already badly out of repair. As sample of its condition it is said that the stairs are so unsafe that they have to be propped up from the basement.

A SCAFFOLD ACCIDENT. — On the 30th of January a scaffold surrounding a chimney-stack that was building in the city dust-yard, London, was blown over, injuring several "sorters," one of them fatally. It was shown at the inquest on the body of the woman so killed, that the scaffold, which was a square one built of planks and fastened together with bolts and nuts, was one hundred and twenty feet high, while the chimney-stack had been carried to a height of only six feet when the scaffold was blown over. The jury returned a verdict of accidental death, appending a rider that "no scaffold should be erected as high as one hundred and twenty feet without carrying up the shaft with it."

BURIAL-PLACE. — An ancient burial-place was discovered in rebuilding a house at Shelby, Eng., lately, wherein were found 15 or 20 coffins, formed of the trunks of trees split in two and hollowed out. They were closely packed together at a depth of from 5 to 8 feet; and at the head of several an upright oaken post 3 feet high was standing. In 4 out of 7 coffins examined, hazel rods or twigs were found in the right hand of the corpse. In 1857 a similar burial-place was discovered, and in one of the coffins was found the skeleton of a woman, which is now preserved in York. Several oval beads were also found; and in the head of the body was found a small round hole, resembling the perforation in the skull of a Roman woman lately discovered at York.

THE BUILDING OF THE BRITISH WAR-OFFICE. — The whole of the English War-Office Building has been condemned by a committee of inquiry. No change has been made in its drainage system since it was built in 1767, and many clerks have broken down in health there.

A NEW WEEKLY. — With the second month of the year, *La Gazette des Architectes* has become a weekly journal of four or eight quarto pages, with a fortnightly supplement of eight pages which will contain such matter as did not need to be published immediately.

NEW GERMAN ARCHITECTURAL WORK. — The Architectural Union of Berlin has just published a richly illustrated work entitled *Berlin and its Buildings*, which gives the detailed history of architecture in Berlin and the manner of its recent development.

PORT OF CALAIS, FRANCE. — The minister of public works proposes to demolish the existing forts, and in their stead build seven detached forts and a wall of circumvallation around the cities of Calais and St. Pierre, at an estimated cost of some $3,000,000.

THE DANGER OF ILLUMINATED CEILINGS. — Members of the French Chamber of Deputies who sit under the glazed ceiling of the hall were lately alarmed by the sound of sudden snapping over their heads. It was found that the heat of the gas-jets above it had caused many of the panes of glass to crack or "star" in all directions.

EUROPEAN CHURCHES. — We do not know what data have been used in the following computations, so we cannot say how reliable they are; but they are not without interest as comparable approximations. St. Peter's Church at Rome will hold 54,000 persons; Milan Cathedral, 37,000; St. Paul's at Rome, 32,000; St. Paul's at London, 35,600; San Petronio at Bologna, 24,400; Florence Cathedral, 24,300; Antwerp Cathedral, 24,000; St. Sophia's, Constantinople, 23,000; St. John Lateran, 22,900; Notre Dame at Paris, 21,000; Pisa Cathedral, 13,000; St. Stephen's at Vienna, 12,400; St. Dominic's at Bologna, 12,000; St. Peter's at Bologna, 11,400; Cathedral of Vienna, 11,000; St. Mark's at Venice, 7,000; Spurgeon's Tabernacle, 7,000.

EPITAPH. — Does everybody remember the epitaph upon Vanbrugh, architect and dramatist? —

"Lie heavy on him, earth, for he
Laid many a heavy load on thee!"

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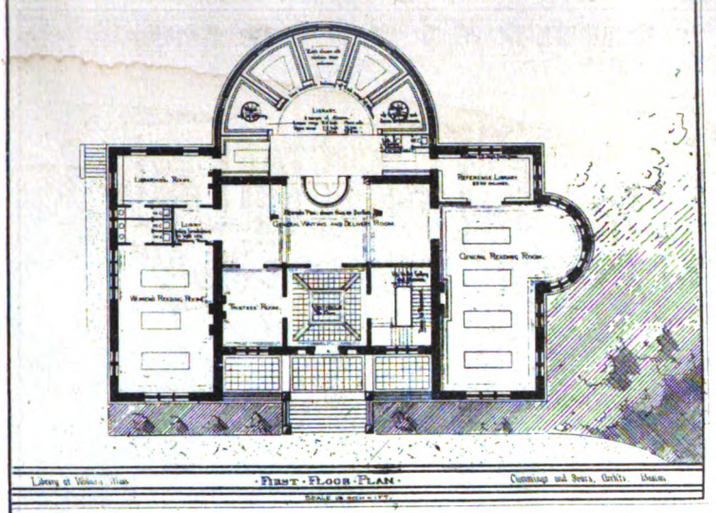

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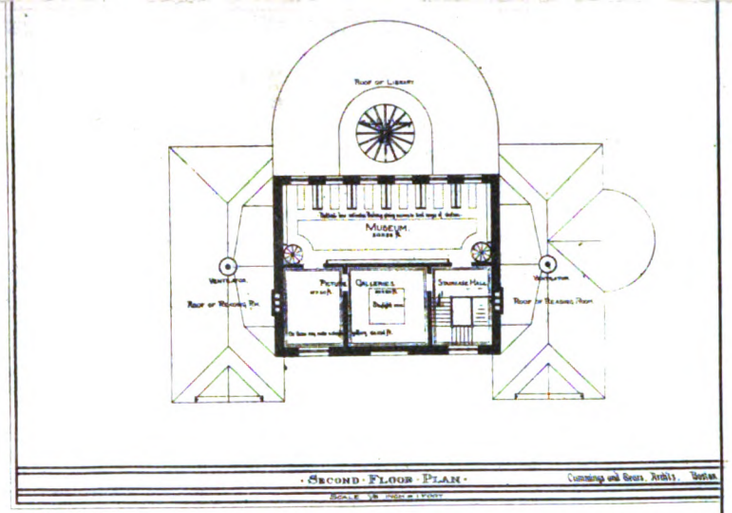

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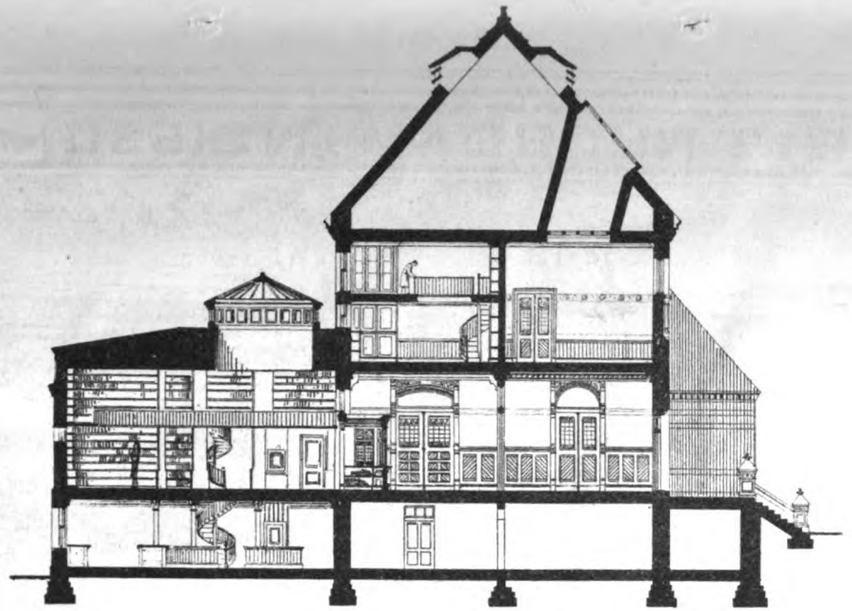

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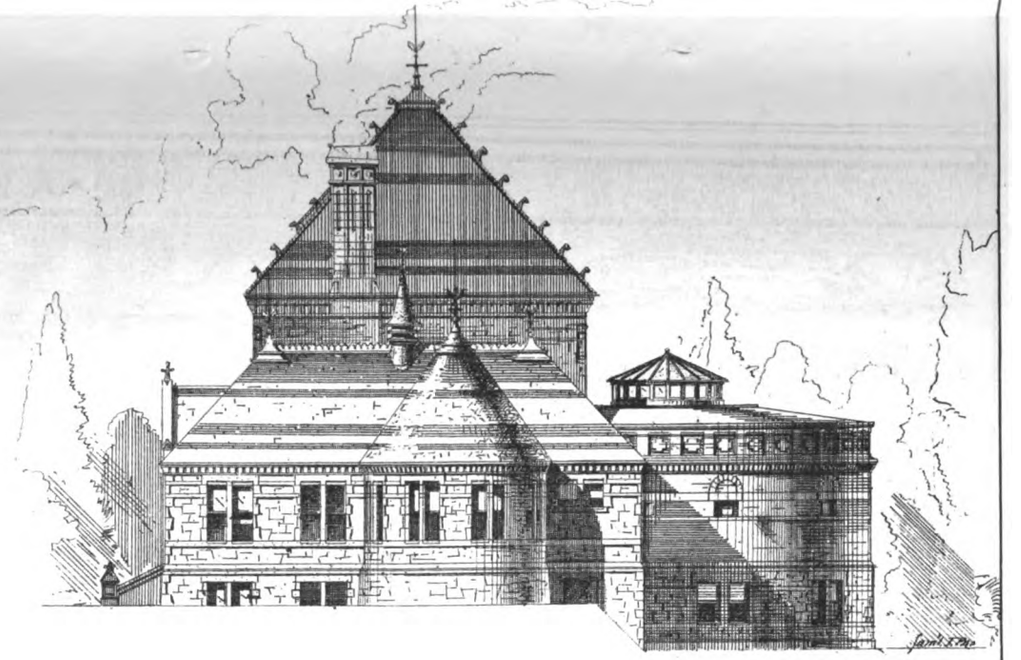

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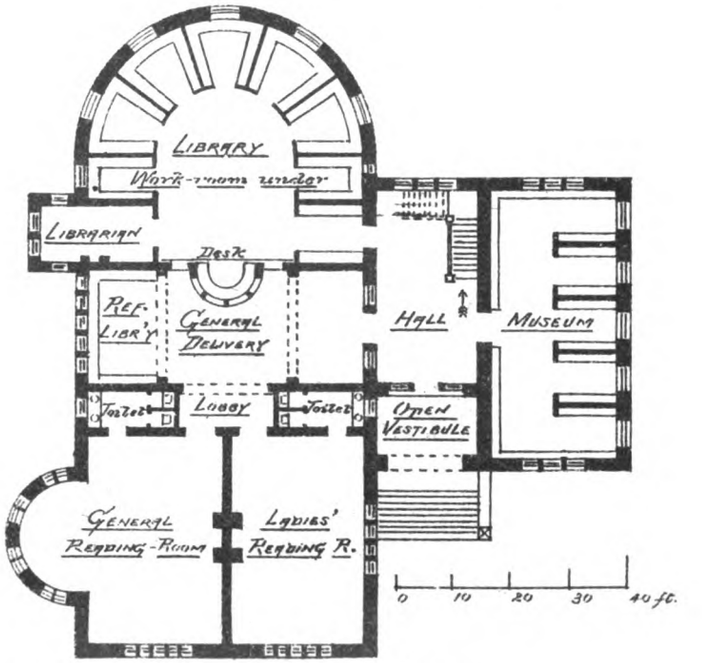

PLAN OF THE ALTERNATIVE DESIGN

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COUNTRY HOUSE

:WELLESLEY MASS:

JOHN A. FOX. ARCHT

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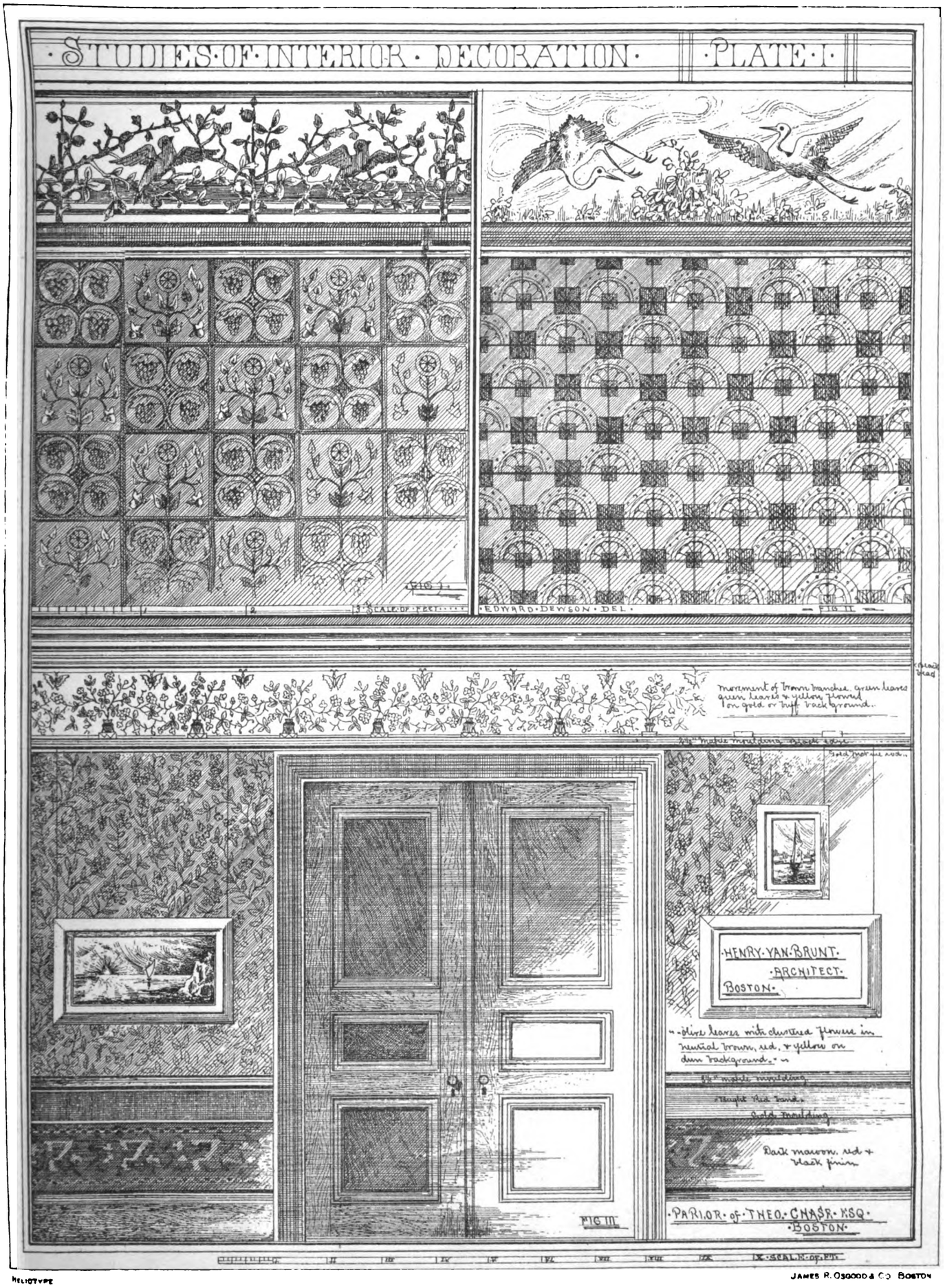

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, MARCH 17, 1877.

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THE verdict of the coroner's jury in the Ashtabula disaster is as explicit as could be desired, as to the responsibility for the catastrophe. Its finding with regard to the bad management of those who failed to use proper measures for the assistance of the sufferers, is probably just. The principal point is, however, the responsibility of the fall of the bridge itself; of this the verdict says that "the fall of the bridge was the result of defects and errors made in designing, constructing, and erecting it; that a great defect, and one which appears in many parts of the structure, was the dependence of every member for its efficient action on the probability that all or nearly all the others would retain their position, and do duty for which they were designed. Instead of giving to each member a positive connection with the rest, which nothing but a direct rupture could sever, the members of each truss were, instead of being fastened together, raised one upon the other, as illustrated by the following particulars: The deficient cross-section of portions of chords, and some of the main braces, and the insufficient strength and bad arrangement of both the horizontal and vertical transverse bracing; in the construction of the angle blocks, as finally modified without sufficient lugs or flanges to keep the ends of the main and counter braces from slipping out of place; in the construction of the packing and yokes used in binding together the main and counter braces at the points where they crossed each other; in the shimming of the top chords, to compensate the deficient length of some of their members; in the placing during the process of erection of thick beams where the plan required thin ones, and thin ones where it required thick ones. That the railroad company used and continued to use this bridge for about eleven years, during all of which time a careful inspection by a competent engineer could not have failed to discover these defects; for the neglect of such careful inspection the railroad company alone is responsible. That the responsibility of this fearful disaster and its consequent loss of life rests upon the railroad company, which, by its chief executive officer, planned and erected this bridge."

THE facts shown in the inquiry were mainly these: that Mr. Stone, the president of the road at the time the bridge was built, was the proprietor of a patent on the Howe truss bridge, which he was in the habit of building in wood; that he was not a trained constructor; that he insisted on constructing a bridge on his favorite plan in iron; that he discharged his engineer, or drove him to resign, for insisting that the braces of the bridge ought to be heavier than he, Mr. Stone, chose to have them; that he put incompetent men in charge of the construction and setting up of the bridge; that the construction of the bridge was faulty, and that in putting up it twice settled out of form before it could be tinkered into shape, — for all of which the responsibility rests on Mr. Stone. In view of this verdict it seems that suits for damages against the company by those who were injured, or the representatives of those who were lost, are likely to be successful in the courts; and we may hope — not for the sake of vengeance on the company, but for example's sake, and the future safety of the public — that they will be forthcoming. It is to be regretted that in such cases the remedy is practically against innocent shareholders rather than the guilty officials. But until criminal suits are provided for by law, the only pressure which can be brought to bear upon railroad companies is that of pecuniary loss; and even if the real offender goes untouched, and those who have trusted him have to atone for his offences, — for this fault was an offence, not merely an error, — the public must have protection. But there remains one lesson which the public are slow to learn, one which goes hard against their grain, but which will surely be repeated until they learn it, — that they must not put their trust in "practical men," where theoretical knowledge finds place.

IT is gratifying to know that the lesson of this disaster is not thrown away, and that engineers and companies are aroused by it to careful consideration of the condition of their bridges. The authorities of the Great Western Railway have taken the timely precaution of making a thorough examination of the Niagara suspension bridge, and have stopped traffic over it for that purpose. The bridge, built by Roebling twenty years ago, is a wire suspension-bridge of eight hundred and twenty feet span; and at the time it was built was perhaps the most daring work of its kind that had been undertaken. It is not likely that it has yet suffered any sensible deterioration; but for a structure in such a perilous position, the only safety is in careful and frequent inspection. We trust that this care of the Great Western is but an example of that which will be shown by all railroad companies in the inspection of their bridges.

A CURIOUS and not uninstructive casualty happened in the case of the Waltham Building in Bond Street, New York, which proved itself at once too secure and too insecure. The building took fire in the basement; and it is said that the night-watchman vindicated his usefulness by escaping through a window to give the alarm, and leaving his keys behind him. It was two hours before the firemen could make their way in or the fire could make its way out, so that they met, and then it was too late to save the building, which was burned with great loss. Queerly enough, it had been rated as fire-proof, because it was supposed to be safe against fire from without, its walls being of brick and iron; but its floors were of wood, and its hoistway proved a flue for carrying the flames through its whole height. It would seem to be reasonably clear that fire-proofing should begin at home, and that it is secured only where the interior of a building is incombustible. The insides of buildings in cities being fire-proof, the outsides may be trusted to take care of themselves; and when all one's neighbors are incombustible there is little danger of fire from without: so that the best way for the community to secure themselves against the communication of fire is to make buildings that will not burn. In this way every really fire-proof building is a blessing to its neighborhood, and several of them together, are impregnable. Where they become the rule, as they are in many cities, there is little danger of fire except from the storage of extraordinarily combustible material; and it is then safe to close them as strongly as may be desired, without fear of their being dangerously secure.

IF repeated warnings will make the community careful to construct buildings that shall be secure, we Americans seem in a fair way to be converted. The falling of a large wholesale grocer's warehouse in New York a few days ago is the last example that we have heard of. So far as we can make out from the accounts in the papers, the front of the building fell out, and the greater part of the floors and their heavy load of merchandise tumbled into the street. We have as yet no account of the matter from experts, and the unskilful descriptions of the reporters do not give much indication of how the building was put together or how it fell; but it is probable that overloading the floors was the cause of the

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fall, by which an adjoining house was partially crushed and the inmates of it endangered, though they fortunately escaped serious injury. There is some indication that the yielding of a floor pushed out an intermediate story of the front; for the lower story remained standing, and the upper part fell, not across the street, but into a tolerably compact heap. The watchman on duty naïvely declares that the building which tumbled down about his ears, as it were, was not overloaded; and the proprietor seems to have been taken by surprise. The truth is, that ordinary people have no way of knowing whether a building is overloaded or not, and need to have the question determined for them by experts. When a building which they have been accustomed to see standing comes tumbling down, perhaps under a less load than that which had previously given it its fatal strain, they are induced to ascribe the fall to some occult and indeterminable cause, just as the good people of a former day would refer the epidemic which their carelessness had invited, to a mysterious dispensation of Providence. It needs but a little of the common sense of Adam Bede to remind them that it "may be but the bearings o' the roof and walls wasn't right, else it wouldn't ha' come down." The examination of properly qualified inspectors is perhaps the only safeguard, for no probable number of accidents will work a change of heart in a business people; yet inspectors cannot be everywhere at all times. There would be probably a considerable security in the enforcement of the provision that is introduced into the proposed building-law of Providence, that the proper load of every warehouse floor should be computed when it is built, and at intervals afterward as it may deteriorate, and that it should be made penal to put more on it. This would naturally be but partially operative, for no occupant can be forced to know how much he is putting upon a floor, or to take account of a shifting load; nor would it be easy after a floor had fallen, to prove just what the load upon it had been. But the provision might make people more attentive by giving them some general idea of what a floor could be expected to bear, and furnishing a sort of rough classification of floors in respect of strength, to which they could become habituated.

DR. ANDREWS's paper read before the archæological section of the Academy of Science in Chicago a few days ago, contained some statements concerning the relics of the mound-builders, which have not been generally known, and which show the builders in the new light of a people who made use of graphic characters, perhaps an alphabet, and of whom written records still remain. He quoted three analogous discoveries made at different times, and of marked significance. The first was an engraved slab of stone dug out of a mound by a body of soldiers encamped in Tennessee during the late war; the second a slab found later at the bottom of a mound at Rockford, Ill.; and the third a pair of stones, flat slabs of slate, exhumed this winter from a large mound near Davenport, Io. In all these cases the stones were found at the very bottom of large mounds, where they seemed to have been placed for records as we now place memorials in the corner-stones of buildings. The stones all bore drawings apparently more or less symbolic, in which representations of the sun and the crescent moon with human features were conspicuous; and in all of them were groups of characters, unintelligible but evidently significant, arranged in columns or in circles. Four of the characters in one of the stones found at Davenport were repeated on that found at Rockford. On two of the stones was a representation of a mound, and upon the mound an altar with a fire burning upon it. On one of the altars the body of a man or animal was burning, and about the base of the other lay three human bodies as if prepared for sacrifice or funeral rites, while a circle of men stood round with clasped hands. In each case the sun and moon were represented as spectators or principals in the ceremony, their participation being indicated by rays drawn from the suns to the altars. The fact that in these cases a thorough exploration of the mounds has brought these inscribed stones to light, while most of the examinations that have been undertaken hitherto have proved superficial, leads to the expectation that such stones may be usually found at the bottoms of the mounds, and hints at an entirely new field of study in this part of American archæology.

THE great work which John Stow accomplished in the reign of Elizabeth is being again undertaken upon a larger scale; the scope of the present survey embracing the antiquities, the architecture, the commerce, the ecclesiastical and educational affairs, the government, the history, the various industries, the judicial and legal administration, the manufactures, the statistics, and the topography of the British metropolis. Mr. John Dexter, with whom the labor has been an ambition for many years past, has already made considerable progress; and his knowledge of the hydra-headed Government of London stands him in good stead in reducing to a few years what might well be a life's toil. As London has seventeen statutory definitions and no map, Mr. Dexter proposes to deal with the area within which the building-line continues unbroken by a field; i. e., the space between Ealing on the west and Upton (on the verge of Epping Forest) on the east, and between Wood Green on the north and Croydon on the south, — about forty times the compass of the capital of Elizabeth. The undertaking, extensive as it is, would be of importance if it should result in nothing more than the identification of historic sites, of which hundreds have passed away from present knowledge; but Mr. Dexter intends to issue from the press at irregular intervals, as leisure shall serve, various gleanings by the way, which will possess an interest peculiarly their own. Some of these may relate to the early connections of New England with London, as to which and other matters germane a priceless collection of materials not hitherto known to be in existence has just been placed at his disposal by a wealthy member of Parliament, who is descended from a member of the Long Parliament.

A NEW society, says the *Building News*, is being organized in Paris, for the preservation of the remains of old architecture throughout France. Those foreigners who have seen how, little by little, the precious old work in France is destroyed by neglect and misuse, or swept away bodily, especially in the towns, Rouen for example, where the fever for modern improvement has declared itself, will agree that every influence in favor of conservation is a thing to be grateful for. A great deal has been accomplished, it is true, within a generation past, through the influence of such men as Lassus, Viollet-le-Duc, Lenoir, and De Caumont. The *Société pour la Conservation des Monuments* under M. de Caumont's presidency has done much both in the direct care of old buildings, and in arousing a general interest in them, without which the effort to preserve them must be comparatively futile. A great number of the most important classical and mediæval works that remain have been brought under the immediate protection of the government by enrolling them in the honored list of *monuments historiques*. Yet even these, as the traveller in remote corners of France finds, are not always secure against neglect or even desecration; and the number of relics of old architecture is far too great to allow of their being all taken under state protection, to say nothing of their being, many of them, in private hands, and so subject to private caprice. There remains too the danger of injudicious restoration; for although much important service has really been rendered by careful and clever restorers here and there, there is among the French an abiding and mischievous desire for a shop-new brightness of aspect. This leads them every few years to chisel off from their house-fronts the firm crust of darkened color with which time tries to defend them against its own erosion, and to expose a fresh surface of soft stone to the action of the weather. The smug look which they give their restored buildings makes a painful impression on the visitor who sees the venerable interiors of St. Front and Angoulême furbished up from top to bottom in the whitest of stone, and hatched all over with the blackest of pointing till every expression of age is scored off from them. It is far less oppressive to see the old surface spotted conspicuously with fresh stones, as at Pisa and Florence, for then one still feels the age of the mass of building, and has a reasonable hope that a few more years will tone the discordant patches into harmony. It may be the function of the new society, and we can hope it will be, to crown their good influence by adding reverence to honor.

THE WOMEN'S PAVILION. — On the 8th inst. took place the closing sale of buildings at the Centennial grounds, and among the buildings sold was the Women's Pavilion, which was bought for $1,325.

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ARCHITECTURAL STUDENTS. — X.

EXAMPLES OF RENDERING: FRENCH.

THE student cannot have better examples of rendering than those that are done in the *ateliers* of the French *École des Beaux-Arts*. Fortunately these are much less inaccessible to the body of students here than they used to be. A good many American architects turn up in Paris during one portion or other of their training, and so see and bring home more or less of the French procedure. There are to be found here and there in the country a good many samples of good French drawing, and in one at least of the architectural schools there is thorough instruction in architectural rendering based on the French methods. Students who can neither go to Paris nor have access to these means of learning may yet, if they will get them, or if those who are charged with their instruction provide them, find a good deal of help in the photographs published by Lampué, the photographer of the French school. These comprise an admirable selection of the best designs produced in the school, all or pretty much all, we believe, of those which are "recompensed," as the saying is, in the monthly competitions, and the most important at least of the drawings offered for the grand prize. There are a great many of them, and they include a great variety of subjects. Every school in which architectural drawing is taught ought, we think, to have a good set of the original drawings of the French school, to serve as models to its pupils of one style at least of rendering, and that an extremely good one. We should think it desirable that every architect who attempts to train good draughtsmen in his office should supply himself with one or two models of this kind for their use; and we should say to any learner that it was worth his while to get at least a few of Lampué's photographs, well selected, which he can commonly do through some friend who visits Paris, and who is conversant with such matters, or even through some French dealer in this country.

The French drawings are frankly conventional; and they are none the worse for that perhaps, since it is quite impossible to give a complete explanation of any architectural design without conventional drawing. Indeed it may perhaps be rightly said, though not without some appearance of paradox, that a rigorously conventional system of representation is for such work both truer and honester than a habit of freer and more naturalistic rendering; for a well-conventionalized system may convey what it has to express to him who thoroughly understands its conventions, with more precision than an imitative means of expression, just as a written language, the most conventional and arbitrary of contrivances, is a more satisfactory means of communicating thought than picture-writing, — because it has been carefully worked out for just this purpose and no other. It may be honester; for a system by which every fact is indicated in a definite way offers less temptation to the tricks of exaggeration or concealment, by which the aspect of a design is tinkered to suit a supposed or known taste, than one which leaves the freest scope to individual caprice. The points that will attract attention in the French drawings are their intelligent system of interpretation, their thorough workmanship, and their pervading artistic feeling. Their decision of handling and the clearness with which all the details are indicated, while each is kept in its place, and breadth of general effect secured, are admirable. So is the skilful way in which the accessories are usually drawn. They are drawn more or less slightly in due subordination to the principal subject, but always in a way to indicate the leading characteristics of the objects. The sculpture, of which much is introduced, being closely associated with the architecture, is sure to be sketched with care and spirit; and nothing shows the general superiority of the French draughtsmen more than their skill in this. Vegetation and other subordinate accessories are sketched with less completeness, but always significantly. Of course there are better and worse among them, and there are of course admirable architectural draughtsmen in all countries; but while we may say that we have scarcely ever seen a bad drawing in the competitions of the French school, it is safe to add that in no country is the general standard of draughtsmen's work so high, and that in the United States there are comparatively very few, even among the best, whose work would stand comparison with the average work of a French *atelier*.

The student will notice that in the French drawings, most care is given to absolute clearness of interpretation, and to the artistic unity and effect to be got by gradation of tint and contrast. This is attained — apart from actual good delineation, in which the French are always strong — by a carefully arranged scheme of graduated tints, adjusted with great nicety over the whole drawing, and skilfully accentuated in putting in the detail. This adjustment of tints cannot be accomplished except with the brush; and French drawings are universally made with the brush, and, as a rule, in color. They are almost always what are called geometrical drawings, perspectives being rarely used, — too rarely, — and these being usually very slight and sketchy. The different planes in elevations are discriminated from each other by delicate variations in tint; the shadows are cast with careful precision, and the detail drawn with rigorous exactness. Every wash that is laid on, whether of color or shade, is nicely graduated from above downwards, being deepest at the top. Thus a consistent effect of gradation is given to the whole drawing: every tint, every shadow, the shade in every window, is graduated in conformity to the whole; and the rendering of the detail is made to conform to the same effect, delicately drawn, and heightened with well-considered emphasis.

This is of course an artificially conventionalized system, and, like all such, is liable to abuse; but its conventions are, on the whole, conformable to the general facts in nature; for in nature every light and shadow, and every fair surface of color, is invariably a graduated tint; and under almost all circumstances, these tints are deeper at the top than at the bottom, in appearance at least, whether from contrast with a bright sky above, or from disturbance by reflected light from the ground below. An experiment with the opposite treatment will convince the student at once that it is not only artistically disagreeable, but harshly unnatural, and only less offensive than the attempt at free and naturalistic treatment of a geometrical drawing. On the other hand, its artistic influence is excellent; for it keeps constantly before the designer's mind the paramount importance of breadth and unity. The quiet subordination of his whole rendering will itself be a prophylactic against confusion or extravagance in design; its broad graduation will help him to study with care the effects of contrast that may be displayed upon it. The grouping of parts, the arrangement of openings, the disposition of ornament, will show against his carefully toned background in a way that will compel a careful consideration; his eye will be made sensitive to the value of breadth and of accent. The use of the brush, and the study of color to which it naturally leads, are no small contingent advantages to be encouraged by this sort of work, especially in these days, when by a curious coincidence the general interest in color-decoration is growing very much; and, at the same time, the use of the pen is displacing it among draughtsmen, in England and the United States at least. We do not argue that the French system of architectural drawing is the best that can be devised; but we are convinced that it is not only the most consistent, but on the whole the most serviceable and instructive, that has yet been developed. The American draughtsman cannot do better than copy carefully such good examples as he can get, — original drawings in color, if he can get access to them; or if not, photographs, to be copied with the brush, in ink or sepia. The encouragement of thorough workmanship which it will give will not be the least of its good influences upon him.

The weak point in the French system is its neglect of perspective, by which it emphatically needs to be supplemented. It may be remembered, however, that the use of perspective, essential as it is, lies in studying the massing of a design, or else in such sketching of detail as must necessarily be done mainly by the eye, for illustration, where rigorous construction is obviously impracticable; that the use of perspective is illustrative, in fact, while that of "geometrical" drawing is, so to speak, exegetical; and that though it needs to be checked by perspective, the serious and minute study of design is always by "geometrical" drawings. On the other hand, the French thoroughness in the study of interior sections of their buildings, a thing which is much slighted here and even in England, we believe, is one of their strong points. It is of the greatest advantage in helping to bring

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the interior of a whole building into keeping, a matter in which we are but very moderately successful, and as leading to the study of color. It hardly need be said that where color plays the *rôle* that it now does in interior work, the use of the brush instead of the pen is most essential.

For French examples of perspective drawing, mainly in mediæval work, we commend the student to the unrivalled drawings scattered through M. Viollet-le-Duc's books, especially the *Dictionnaire de l'Architecture Française*. These he will naturally be tempted to copy with the pen or pencil, though the author, who draws them all himself, true to the French instinct, has handled the wood-cuts in a way that invites the brush almost as much as the pen: indeed, it is pretty evident that in drawing them on the block he has for the most part washed in his tints with the brush, leaving it to the engravers to interpret them in lines. We know of no drawings in which the beauty and refinement of the best Gothic architecture are set forth so satisfactorily as in these, from the architect's point of view at least. We also commend for slighter and more general sketches, certain wood-cuts drawn by Tomaskiewicz, of which we have seen a good many here and there of late, and notably the illustrations of M. Félix Narjou's *Notes de Voyage*, some of which have been published in our own columns, though more or less marred in effect by the necessary imperfections of newspaper printing. They are admirably drawn, not overloaded with tints, and have all the characteristics of clear, refined, and well accentuated pen-drawings. Finally we would suggest, for more elaborate practice, copying some of the many French architectural etchings, among which we may mention as excellent in their several ways, those of Guillaumot and Rochebrune.

STUDIES OF INTERIOR DECORATION.

III.

IN the second paper of this series we endeavored to show how the idea of the wall-decoration of a certain room was by process of reasoning derived from considerations of its aspect and of various given conditions of occupation and use. It now remains for us to take up the question of the ceiling, which as indicated in fig. 3, Plate II., has a large cornice and a panel-moulding of stucco.

In a harmony of color obtained by an arrangement of neutral and positive tints, such as the necessities of the problem have established on our walls, the appearance of white in any quantity, as in the ceiling and in the marble chimney-piece, if it is not an element of intolerable discord, at least leaves upon the mind a sense of incompleteness. If our conditions required the retention of these features, we should have been compelled, in order not to isolate them, to treat our walls with very light and tender tones, depending for the desired effect of elegance and luxury on delicate figures or medallions in colors liberally enriched with gold. Such a treatment implies a sacrifice of the idea of hospitable warmth with which we started. Until his white paper has been entirely overlaid by his washes, the painter in water-colors can obtain no effect of nature.

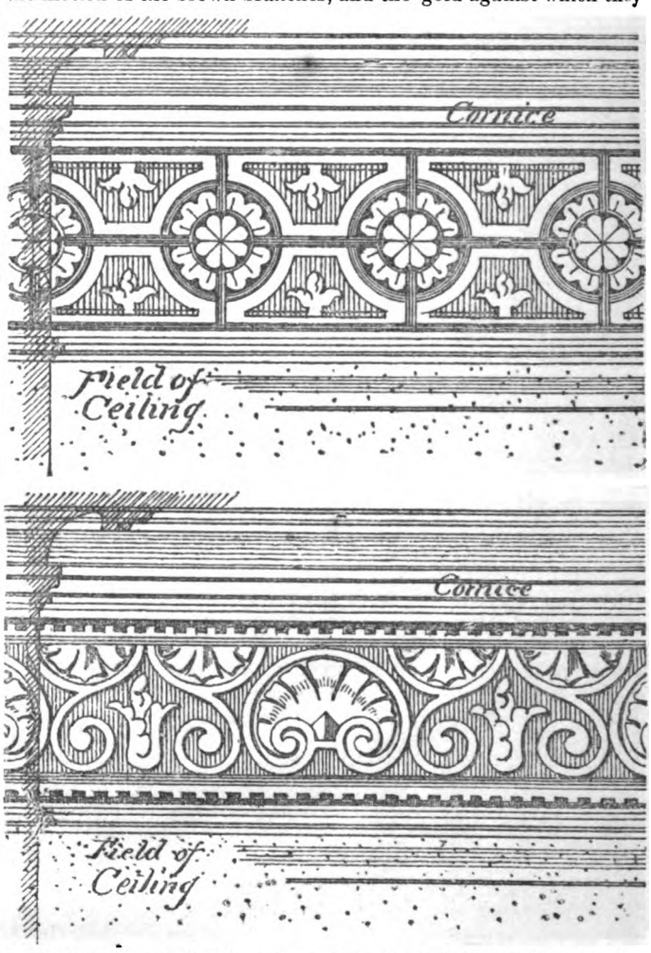
For the sake of harmony therefore, and in order to avoid any harsh line of demarcation at any point, we should entirely enclose the apartment with a homogeneous decorative treatment. Our walls must be reconciled with the floor, and our ceiling be made consistent with the walls.

It being recognized then that we must get rid of the whiteness of the ceiling, the question is, How can we enhance our decorative effect in so doing? We must not lose sight of the fact that we are to create an effect of light and warmth, as the apartment receives no direct light from the sun. Our walls are occupied by four horizontal zones of various values in color and dimensions, having a natural tendency to diminish the apparent height of the room. A dark or heavy treatment of the ceiling would absorb the little light which we have, would oppress the room with its weight, and tend still further to diminish its apparent height. It is a legitimate conclusion therefore, that the general effect of the ceiling should be lighter than the walls, and that the walls should melt into the ceiling by harmonious degrees of color, hereby correcting or excusing the error of the wall-treatment, and restoring to the room its proper vertical dimensions.

Consistently with this conclusion, our cornice should not be treated as the crowning feature of the walls, thereby defining and drawing attention to their limitation of height, but rather as a means by which the walls may be introduced into the ceiling, and the line of demarcation between the two features as nearly as possible obliterated. The feature of the walls which is nearest to the ceiling is the frieze, and this, as we have seen, is so far the most brilliant and spirited part of the composition, — a play of brown branches, green leaves, and bright yellow flowers, on a field of buff and gold. Now by spreading over the ceiling all the characteristic features of this frieze, we should accomplish our object, indeed, most directly and with the least possible trouble; but in so doing the frieze would immediately lose its predominance and interest, and cease to play its due part in the melody of color. Whatever we do, the frieze must not be rendered less precious or peculiar by extension or by incautious repetitions. It must strike the highest note.

The difficulty may be met by taking up certain *motifs* or suggestions of color in the frieze, and using them in our ceiling with such discretion that the frieze shall maintain an easy predominance without acting as a zone distinctly dividing the ceiling from the wall.

The feature of the ceiling nearest the frieze is the belt or border surrounding the central field. Evidently the border should be relatively dark, and the field light. If there were no bright frieze on the wall, we might reverse the situation, and give to this border the predominance of the frieze, making the field of the ceiling by comparison darker. As it is, the frieze must control the treatment of the ceiling. Now if we occupy this border with the cool tea-green which occurs in the frieze, and is its characteristic local color, and the centre field with a pale but clear echo of the warm buff in its background, — leaving untouched the yellowness of the flowers, the motion of the brown branches, and the gold against which they



are defined, — we shall have brought walls and ceiling into loyalty to the same key-note without competing with the frieze.

Between the frieze and this neutral green belt of the ceiling, there is interposed the cornice. This we treat with the same green and with the neutral colors of the wall-screen below, recalling faintly in the smaller mouldings certain characteristic notes of color, — the red and black of the walls, — in such a manner as to give detail and refinement to the cornice, and cause it to melt almost imperceptibly into the ceiling. The stucco moulding between the belt and the field of the ceiling again echoes some of the darker tones below, so as to form a clear division between the two features.

By this treatment we have brought the ceiling into harmony with the walls; we have done just enough to make it inconspicuous, no more. At this point we might safely leave it if we could be content with a negative virtue. But as the problem is to make the room beautiful, the ceiling presents an area far too important to remain quite without enrichment or incident of some sort, to give it character and interest. This enrichment may be moderately applied either to the field or to the border; not to both, however, as this would create conflicting interests and destroy the repose which is as essential here as in the walls. If applied to the field, it should be in the form of a pale damask figure, buff upon buff, — the background and the figure occupying about an equal area, — a presence rather suspected than acknowledged. (See Plate II. fig. 2.) If used in the border, a more emphatic treat-

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ment is practicable, always having in view the absolute necessity of keeping the frieze distinctly pre-eminent. A greater emphasis at this point is admissible, because the area to be treated is much smaller and the tone darker; it is therefore the more attractive field for decoration. The design for this decoration should be such that it would be read as well, be equally intelligible, from whatever portion of the room it might be seen; there should be no "upside-down" to it. It should not follow any centre line in the belt, or have any fixed or recurrent relations with its borders. It should not be symmetrical or formal in any way. Any such decoration, for example, as is suggested in these diagrams, would be too monumental for the place, — implying an architectural treatment which is not justified by the treatment of the wall-surfaces below. Japanese motives, which studiously disregard symmetry, and are concerned only with balance of parts and subtle harmonies of color, at once occur to the mind. Marguerites, or any other round, regular, rosette forms, irregularly spaced with varying sizes and with gradations of tint, buff, red, brown, all neutralized and soft upon our pale green background, — this treatment, as exhibited in Plate II. fig. 1, would exactly fulfil our conditions. We also need a texture similar to that of the wall-papers, but we seek in vain for any such pattern: it cannot be found; and following the rule imposed upon us, we finally, after much search and deliberation, settle upon a paper which has loosely flowing soft green branches and leaves, with round buff fruit-forms, wandering over a pale diaper formed of two light green shades; the general character of which is set forth in fig. 3 of Plate II. As this figure encounters the borders of the belt at frequent intervals, an enforcement by color of the small moulding adjacent on either side becomes necessary. Fortunately the green of the leaves in this composition is almost exactly that of the green in the frieze; and the pale or neutralized buff of the fruit-forms exactly such as can be repeated, according to our ideal, on the field of the ceiling.

The effect produced upon the mind through the eye, by a combination of various colors and forms such as are employed in the decoration of this room, by the harmony resulting from their contrasts and repetitions, from their lines and proportions, is precisely analogous to that produced upon the mind through the ear, by a musical composition. And this result has been reached, not by any great expenditure of money; not by accident — for music is not fortuitous; nor yet by following a fashion — for there is no room like it elsewhere; but by confining the artistic faculty of "feeling" or taste within limits deliberately established by common sense.

H. V. B.

THE ILLUSTRATIONS.

THE NEW YORK HOSPITAL.• MR. GEORGE B. POST, ARCHITECT.

(120 Broadway, New York, N.Y.)

THE new building of the New York Hospital, in West Fifteenth Street, between Fifth and Sixth Avenues, was opened on the 16th instant. The old City Hospital was situated on Church Street, and was founded in 1773 under a charter from King George III. The extension of Pearl Street necessitated the removal of the old building, and in 1874 the present new building was begun. It will not be insured, as it is as nearly as possible fire-proof, being built throughout of iron, brick, and stone. It is intended to accommodate two hundred patients, which will all be pay cases, the occupants of the wards being charged one dollar per day. For those who can afford better accommodation, a number of rooms have been fitted up, the object being to make the institution self-supporting, and to secure the best of treatment. The cost of the building, including the ground, will be nearly one million dollars.

HOUSE AT POMFRET, CONN., FOR COL. H. A. BABBITT. MESSRS. CABOT AND CHANDLER, ARCHITECTS.

(60 Devonshire Street, Boston, Mass.)

STUDIES OF DECORATION. — II.

DESIGNS ILLUSTRATING THE TREATMENT OF A CEILING.

See preceding article.

CHAPEL OF ST. MICHAEL'S PARISH, BRISTOL, R.I. MR. STEPHEN C. EARLE, ARCHITECT.

(9 Pemberton Square, Boston, Mass).

This chapel is built of Longmeadow brown-stone, in random squares of rock face work. The main room is finished up into the roof to a height of twenty-five feet. The inside finish is of ash, and the walls and ceilings are tinted and decorated in water-color. Cost about $12,000.

THE EXPERTS AND THE NEW YORK CAPITOL.

THE following letter has been addressed to the leading New York papers: —

The undersigned have recently appeared before the joint Committees of Ways and Means and Finance of the State Legislature, at their request, to testify as experts as to the propriety of the changes made in the plans of the architect for the State Capitol building by the Advisory Board, subject to which plans some work has been already executed. The assertion has been made in the daily papers that the undersigned are representatives of the Renaissance school of architects, and that therefore their testimony is of no value in this case, as the upper stories and porches, as arranged by the Advisory Board, are of Gothic design, and that their opposition to the design is a natural result of the "notorious" war of styles. Were it true that the undersigned were exclusively devoted to the practice of Renaissance architecture, their opinion should for that very reason be entitled to very great weight, as the building practically is more than half completed in Renaissance architecture of the most distinctly marked character. But in reality they mainly belong to a more liberal school, and have severally studied and practised in both styles, while one of the subscribers has never designed except in the most pure Gothic. It has been stated that some of the subscribers have never examined the amended plans of the Advisory Board, and that consequently, being ignorant of the designs, their criticism is valueless. Those of the subscribers who had no opportunity to examine the amended plans are familiar with the published plans of the Advisory Board, and have seen the work already executed under its direction and in conformity with its final detailed drawings. The latter alone is sufficient to show in the most emphatic and conclusive manner that no amendment of the published drawings of the Advisory Board, while the system of design which they have adopted is retained, can reduce to harmony elements so discordant as pure horizontal or Italian Renaissance surmounted by Romanesque forms, treated with late Gothic and Moresque details.

The undersigned maintain that were they appointed as judges to select a design for a capitol building, they would without hesitation choose that design which combined most perfectly the best solution of the practical problem of convenience and constructive merit with artistic excellence, without regard to the style in which it was studied; but they certainly would consider it a disqualifying defect in any design were one style used for the lower half of the building and a radically different one for the remainder. The fact that the Advisory Board have supplemented an Italian Renaissance design already completed for more than one-half of the height of its walls by a design essentially Gothic, is practically either an assertion on their part that it is impossible to achieve a satisfactory result by completing the building in the style in which it was commenced, or an admission that they were incompetent to undertake to do so. The magnificent examples of Italy and Europe generally are a sufficient answer to the first position. If the second is accepted, it was the clear professional duty of the two architects on the board to resign their positions.

The examination of the work already executed from the amended designs has served to confirm the undersigned in their opinions formed at the time at which their attention was first directed to the published design of the Advisory Board, that if carried into execution it would be totally wanting in unity, and consequently an architectural failure.

As size, beauty of material, and workmanship, form the first elements of grandeur, the structure, with its great mass and incongruous magnificence, would vitiate instead of educating the taste of the people; and should the public improve in artistic appreciation, it would be received at its just value as a lasting monument to the narrow-mindedness and blind devotion to a favorite style, which has led the authors of the amended design to ignore all considerations of æsthetical proprieties in the plans which they have prepared; and if allowed to be erected without formal protest, it would be a perpetual reflection upon the architectural skill of the generation in whose time it was erected.

GEORGE B. POST.
R. M. HUNT.
N. LE BRUN.
HENRY DUDLEY.
D. LIENAU.

NEW YORK, Tuesday, March 6, 1877.

AMERICAN INSTITUTE OF ARCHITECTS.

BOARD OF TRUSTEES.

REGULAR quarterly meeting, Thursday, March 1, 1877.

Present, Messrs. Dudley, Haight, R. G. Hatfield, Hunt, Pfeiffer, Walter, and Bloor. Mr. Walter, President, in the chair.

The Secretary presented a number of communications; . . . a letter from Mr. Robert Briggs offering to read a paper before the next Convention on "The Relation of External Moisture of Air to the Temperature of Comfort or Health."

The Secretary was instructed to accept Mr. Briggs's offer. . . . The Secretary stated that all the Chapters had been requested to prepare papers for the Convention. . . . The Secretary was directed to have five hundred copies of the By-Laws printed. . . .

The time for the regular monthly meetings was changed from the third Thursday of the month to the first Thursday, so as to accord with the days for the general quarterly meetings of the Board.

The Secretary presented answers to the letters issued for infor-

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mation as to adjudicated cases bearing on the emoluments of architects through the operation of a lien law or otherwise. . . .

The communications on the subject were referred to Mr. Hunt as a committee of one to report at the next meeting of the Board.

NEW YORK CHAPTER, A. I. A.

Special meeting held Thursday, Feb. 14, 1877.

On motion of Mr. Hunt, seconded by the Secretary, the following resolutions were carried unanimously: —

Resolved, That the New York Chapter of the American Institute of Architects approve of and concur in the provisions contained in the report of the Committee on Examinations, relating to theatres hereafter to be erected in the city of New York, as set forth in "An Act to provide for the Stability of Construction and Security against Conflagration, Panic, or other Accident, in Theatres hereafter to be erected in the City of New York;" and that the said Committee be requested to take such steps as they may deem expedient, in order, if possible, to secure its passage as a law during the present session of the State Legislature.

Resolved, That the New York Chapter of the American Institute of Architects approve of and concur in the recommendations contained in the report of the Committee on Examinations, relating to measures deemed necessary to provide for the security of the public in existing theatres in the city of New York; and that the Secretary of said Chapter be requested to transmit a copy of the said report to the Superintendent of Buildings, together with a copy of this resolution.

On motion of Mr. Haight, a vote of thanks was extended to the Committee on Examinations, for the reports just presented by them.

Regular business meeting held Tuesday, Feb. 6, 1877.

Under head of reports from standing committees: —

The Chair reported from the Committee on Examinations, that the two documents adopted by the Chapter at its last meeting, in relation to prospective and existing theatres, had been officially indorsed by the Board of Fire Underwriters, and had been forwarded to the State Legislature.

. . . . . .

The President and Secretary were empowered to prepare and sign a protest, in the name of the Chapter, against the transfer of the building-department of the city of New York to the fire-department, and to transmit the same to the State Legislature.

CLEOPATRA'S NEEDLE.

THE obelisk which is usually known as Cleopatra's Needle — but which is only one of a group of three, once known as Cleopatra's Needles, one of which is still standing not far from its fallen comrade at Alexandria, while the third stands in the Place de la Concorde, Paris — has a curious modern history. In 1801 it was attempted to remove it to England, as a memorial of the evacuation of Egypt by the French; and to this end voluntary contributions of a certain number of days' pay were obtained from English soldiers and sailors, the largest prize French frigate was purchased, and part of a stone jetty was built by soldiers and sailors detailed for the purpose. But all this was brought to an end by orders from the commanders of the naval and military forces in the Mediterranean, who objected, — one because of the damage that such employment would cause to uniforms and equipments, the other because of the danger to which the crew of the vessel transporting the obelisk would be exposed. The attempt was therefore abandoned, the contributions were returned, and the events of the campaign were inscribed upon a bronze plate which was let into a side of the obelisk, and has since that time been stolen by Turks or others. In 1819 Mehemet Ali presented it to the Prince Regent, and since that time various plans for its removal have been considered, and abandoned on the ground of expense. The plan which Mr. Dixon has adopted for its portage to the Thames Embankment we briefly mentioned not long since. He proposes to incase the obelisk — which measures sixty-eight and a half feet, and nearly seven feet at the base — with a cylinder of iron, with strong diaphragms on the inside, calked where the obelisk passes through them so as to form water-tight compartments. The cylinder is to be ninety-five feet long by fifteen in diameter, and will draw nine feet of water. The cylinder and its enclosed obelisk will be rolled to the water on ways laid for that purpose. After it is launched, the keel, steering-apparatus, pumps, spars, etc., will be fixed, and the vessel properly ballasted. When it reaches London it will be lifted to the top of the embankment, and rolled to the site it is to occupy. The casing will be removed, and the obelisk will be raised by the aid of hydraulic rams to such a height that the level of its axis will be a little above the level occupied by its centre of gravity when the obelisk is upright. Trunnions supported in a proper manner will be then attached to its sides; and it will be allowed to revolve on them slowly until it becomes upright, after which the pedestal will be built up under it. The whole cost of these operations is estimated at about $50,000, which is about one-eighth of the sum expended in getting the French obelisk in place.

MONUMENT ON DORCHESTER HEIGHTS. — It is said that the proposed monument on Dorchester Heights is to be dedicated April 19.

CORRESPONDENCE.

THE STORM. — FALL OF A WAREHOUSE. — THE BOND STREET FIRE. — PANIC IN THE CHURCH OF ST. FRANCIS XAVIER. — THE PROPOSED MUNICIPAL BUREAU OF ARCHITECTURE.

NEW YORK.

THERE is little to report from the metropolis but disaster and wreck. The storm which swept over the city on the 9th inst. played havoc with parts and portions of buildings, involving an aggregate loss which will probably reach $100,000. In particular damage was wrought to the mock cornices of sheet iron, which show broad surfaces and many angles to the wind, and which being insecurely fastened were curled up and ripped off by the wind. The Stevens Apartment House at Broadway and Twenty-Seventh Street suffered in this respect, the racket and roar of the ripping roof creating quite a consternation among the occupants of the house. Of plate glass and other windows broken the number is beyond count; and it certainly is little to the credit of the glaziers that it should fail so completely in the emergency of a not over-violent storm.

On the evening preceding, about ten o'clock, the wholesale grocery warehouse of Henry Welsh on Greenwich and Franklin Streets fell, a mass of ruins. It was a five-story structure built on made ground, and packed to the ceilings on the several floors above the first with such weighty commodities as salt, sugar, and flour. The building, originally a sugar-house, had been standing about thirty years; but the fall came without the least warning, luckily without loss of life, though a small frame-house adjoining was crushed beneath the *débris*, and the family of eight was buried for a while, but was dug out without serious injury. The total loss will reach over sixty thousand dollars. The possibility of similar accidents from other overloaded warehouses in the city should call for an exercise of some prevention on the part of the Department of Buildings. In fact, the superintendent came out the next day with his standard explanation, that he but recently had men engaged in this very work of ferreting out overladen buildings, but for want of funds was compelled to withdraw them. There are hundreds of altered buildings, originally built for tenements, and afterwards used for warehouses, which might in like manner at any moment fall in ruins.

Tuesday evening, the 6th inst., was marked by the burning of the Waltham Buildings on Bond Street near Broadway, the greatest fire our city has suffered by since the Broadway fire over a year ago. The buildings were great six-storied iron-fronted structures, with heavy brick walls on sides and rear. Stair-wells, ventilating-shafts, and light areas through the central portions of the building gave the flames full vent. Early in the evening the presence of fire somewhere in the basement or sub-basement was discovered, and no time was lost in summoning the fire-department; but the extraordinary precautions taken to make the lower portions of the building burglar-proof were equally effective against the attempts of firemen to force an entrance, and it was a long time before the doors were forced. When they were opened the men were loath to enter, in fear of the loosening of the floors and the falling of the safes (of which there were twenty-nine in the building). For four hours or more the flames were fierce, making a complete wreck of the building, and causing a loss of over a million and a half of dollars, not allowing for the probable salvage. The buildings were put up in 1871, and were accounted in popular opinion as fire-proof, though heavy Georgia pine flooring and interior finish gave food to the flames. Architecturally there is no great loss in the destroyed building, which was noteworthy mainly on account of the careful and artistic manner in which the façade was painted in neutral tints, in place of the usual expressionless white paint. It is to be rebuilt at once.

Another event of the week has been the fatal panic in St. Francis Xavier's Church, by which seven lives were sacrificed. There was a "women's mission" in progress, and on Thursday eve last the body and galleries of the church were packed with women and children; a sermon on "Hell" was in progress, when suddenly shrieks broke from an hysterical woman in the western gallery. There was a slight commotion, when a boy's voice cried out "Fire." A rush for exit was made, especially from the western gallery. There was a wide stairway leading to the front lobby, from which three wide doors led to the street without. In the elbow of the stairway a jam occurred, a stout woman fell, and over her prostrate body the throng rushed. In the body of the church there was crying and fainting, but the voices of the priests were heard and the rush stayed to a certain extent. When the police had cleared the scene of the tumult, seven dead bodies were stretched on the stone floor of the lobby, — six women and one boy, suffocated to death. There was no damage to the edifice, and no persons wounded to any great extent. The building was liberally provided with means of exit: hence it would seem that loss of life in such cases is beyond control, and only by a general individual self-control can these destructive rushes be prevented.

Last of the disasters in its possible effects on building-matters is the work of the Albany legislators on our building-law. Every year brings uncertainty to the minds of the architects and builders of this city, when the Albany statesmen begin their tinkering-operations on the law. The main aim seems to be the possession of the patronage attached to the building-department.

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The bill sent up from the Chapter here is almost lost in the turmoil of politics. Another general bill for the government of the city provides for a bureau under a single head to be called the City Architect, to be charged with the construction and repair of every building erected in the city at the expense of the Treasury, including all schools, all buildings of the Park Department, all buildings of the Department of Charities and Correction, the Third District Court-House, and the new court-house, and also the repairs of all buildings erected through this bureau. It will also have the care of all public buildings belonging to or leased by the city, not under the charge of any department (like prisons, armories, drill-rooms, etc.), or in the care of the Board of Education, or in that of any public institution. This does away with the system of employing three or four architects by the different departments heretofore in vogue. Were this to go into effect, it would leave the completion of the Third District Court-House to other hands than those of Withers, take from Mr. L. Eidlitz the extension of the Tweed Court-House, leave schoolhouses free from the conventionality of their present engineer-architect, and generally create a great municipal *atelier*, with its possibilities of corruption and scandal, merely to do work now accomplished by a division of labor among various members of the profession. There is no aim towards economy nor a desire to bring out better artistic results in the proposed change.

JOURNEY OF AN ARCHITECT IN THE NORTH-WEST OF EUROPE.[1] — VII.

FIG. 112 represents the ground-plan of a small mansion, the arrangement of which, we must say, is open to criticism.[2] We enter directly from a rather narrow vestibule into a large drawing-room adjoining a smaller one; the door of the dining-room is opposite to that which leads from the passage forming the carriage-entrance. The vestibule is too small, and the visitor and the friends who receive him are crowded into too little a space; but the internal decorations of the drawing-rooms amply deserve the praise which we have already given. The dining-room is separated from the large drawing-room, and that again from the smaller one, by wide openings (fig. 113), which can be closed by thick leathern hangings. The framework of these openings tends to lessen the apparent height of the

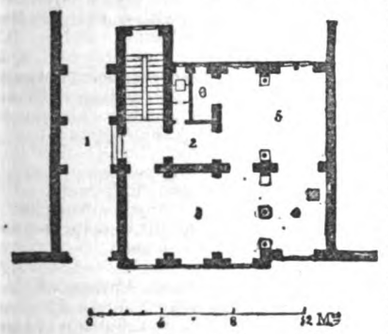

Fig. 112.

1. Passage to carriage entrance. 2. Antechamber. 3. Drawing-room. 4. Back drawing-room. 5. Dining-room. 6. Morning-room.

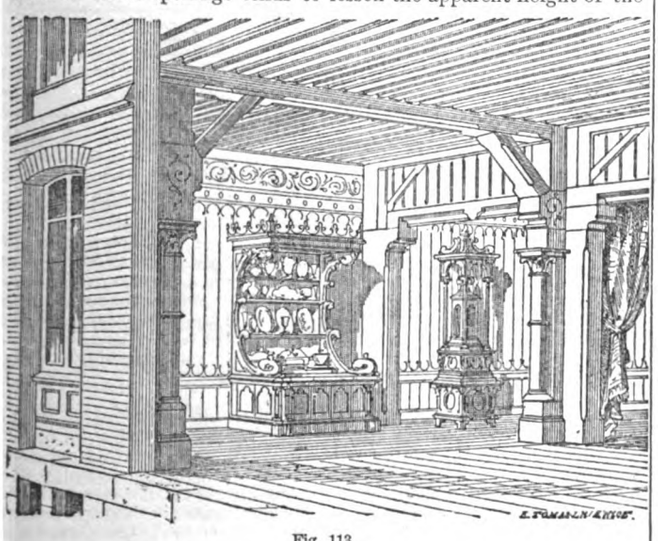

Fig. 113.

apartments; and in the dining-room supports a partition wall. The whole of this combination is in oak; some parts are decorated and enriched with very brightly colored designs. The ceiling is oak, formed of small bare beams with chamfered edges. The long intermediate panels are painted of a uniform tint, with a few stripes of another color. The pilasters have chamfered edges; and above the fillet which divides them midway, they are ornamented with designs in trellis-work.

The large stove which warms the drawing-rooms is made of enamelled terra-cotta, the colors of which, however bright they

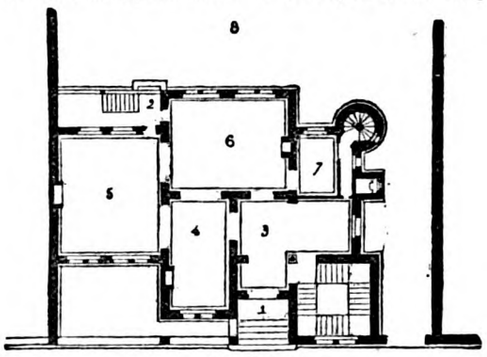

Fig. 115.

1. Porch. 2. Garden entrance. 3. Hall. 4. Small drawing-room. 5. Drawing-room. 6. Dining-room. 7. Library. 8. Garden.

may be, are a poor substitute for the cheerful blaze which the eye looks for in vain during the long winter evenings. Terra-cotta is much used in Germany; and this manufacture has been brought to to great perfection in that country.

We give in fig. 115 the ground-plan, and in fig. 116 that of the first floor of a mansion more important than the preceding. In Paris it would perhaps be considered only a private house; but here it occupies a much higher rank.

Carriages do not enter under a covered way which is, especially in the North, an unfortunate omission. It is true that a projection of the gable shelters the steps and protects visitors. The front wall is separated from the public way by an area, in which is the kitchen entrance; the servants and tradespeople do not cross the threshold of the principal door, which is covered by a projecting porch. The hall is divided into two unequal parts; the largest of these serves as an ante-room, and is of sufficient size to be used as a cloak-room, and to contain benches for servants while they wait

Fig. 116.

1. Antechamber. 2. Bedrooms. 3. Dressing-rooms.

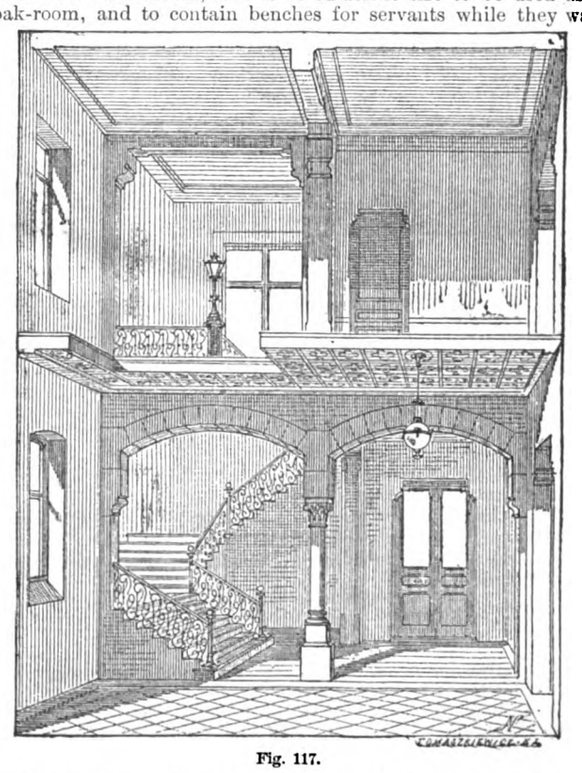

Fig. 117.

for their masters. An isolated column, which indicates the point of separation of these two portions, as shown in fig. 117, gives an

[1] Printed by permission from the advance sheets of a Journey of an Architect in the North-west of Europe. Translated from the French of M. Félix Narjoux. James R. Osgood & Co., Publishers.

[2] See, for further details, *Habitations Modernes en Europe*, par MM. Viollet-le-Duc et Félix Narjoux, architectes. Librairie Morel, 13 Rue Bonaparte, Paris.

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air of elegance to the hall; and this simple arrangement enables one to understand the construction of the staircase. The kitchen and its dependent offices are connected with the ground-floor by a spiral staircase in a turret, which is approached by a wide passage leading to the closets. We must not forget that the servants in Germany are not entirely separated from their masters, but live more with the family than is the case with us; and the mistress of a house on the other side of the Rhine does not consider it derogatory to go occasionally to superintend the kitchen department. On the first floor is a large ante-chamber where the children can play. Then there are very large and lofty bedrooms, each with its dressing-room fitted with hot and cold water, a large bath and shower-bath — the latter an English fashion.

We must here notice the manner in which the beds are placed. There is no recess, but the bed stands with one of its shorter sides against the wall, so that it projects into the room and leaves both of its longer sides exposed. This arrangement, when the size of the room will permit, is the most convenient and the most healthful, and is especially useful in cases of sickness. It is always employed in large state bedrooms in palaces, and was constantly found in those of the middle ages. The want of space is the only

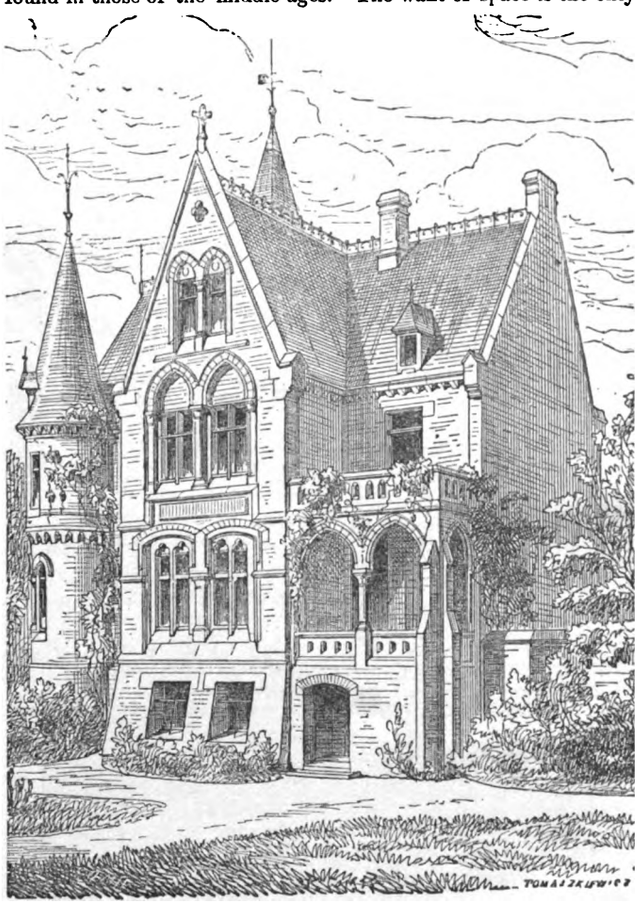

Fig. 119.

reason which can induce people to prefer the position now commonly adopted.

The façade (fig. 119) resembles those which we have already seen. There is too much variety in it, and it has not a quiet appearance; but the principal parts of the structure are well indicated. The spiral staircase, as well as the drawing-rooms and vestibules, project externally; large double windows give light to the principal apartments, and, contrary to the laws of symmetry, lesser ones open into the smaller and secondary rooms. Imbricated work plays an important part in the decoration of these façades, to which both recessed and projecting arches give a varied outline. Terraces and covered balconies render the interior of the house more agreeable, and allow sedentary inhabitants frequently to take a little exercise.

NOTES AND CLIPPINGS.

A CURIOUS EXPLOSION. — A curious accident that lately occurred shows that even a water-tank must be as carefully approached with an unprotected light as a leaky gas-main on a powder-magazine. A workman on board H. M. torpedo-ship "Vesuvius" approached an iron water-tank with a candle, when the hydrogen gas that had been liberated by the galvanic action which had very likely been established between the zinc coating of the galvanized iron and the edges where in fitting the sides together the ungalvanized iron was exposed, exploded with such violence as to tear out the side of the tank.

THE INDIANA CAPITOL. — The walls of the Indiana Senate Chamber in Indianapolis suddenly settled with a loud crack a few days ago while the Senate was in session. Everybody rushed out without waiting for the formality of an adjournment, and it was some time before business could be resumed.

A NEW METHOD OF FIRE-PROOF CONSTRUCTION. — We recollect that at the Convention of the Institute held at Boston just after the first great fire at Chicago, the members discussed at much length the best methods of fire-proofing buildings. One method that was discussed and received much approval was that of using for the supports of fire-proof floors large wooden beams coated with plaster. We do not know whether this method has been adopted to any great extent in this country. An English firm, Messrs. Evans and Swain, have lately patented a fire-proof floor which is constructed on this principle. Joists 2″ x 11″ resting for a suitable distance upon the walls are placed side by side and closely bolted together so that there is no intervening space. The outer joists also rest on the walls. The floor is thus nothing but a solid slab of wood, which would be affected by a fire above or below it by being charred to the depth of an inch or so, as is the way usually with solid beams exposed to fire. But in order to protect it even from this slight damage, dovetail slots are traversed across the under side of the floor, and so spaced as to give a good key for plastering. The upper surface is protected by a layer of cement concrete, which is laid upon a thin layer of sand or loam in order that it may not be cracked by the inevitable shrinking of the timber. The questionable things about this invention are its cost, which is likely to be so near that of other things as to hinder its introduction, and the facility it affords for dry-rot, which would be pretty sure, we should think, to invade such a floor in no great time.

THE PARIS EXHIBITION. — All the stone and sand needed for the exhibition building are taken from pits and quarries opened for that purpose on the spot. Between seven and eight hundred cubic yards of masonry are laid each day, in laying which about sixteen hundred bags of Portland cement are used, which is mixed with sand in twenty-five mills.

PORTLAND CEMENT. — Mr. I. J. Mann, assistant engineer, Port and Docks Office, Dublin, has made experiments upon the qualities of Portland cement, which prove that coarsely ground cement when used neat (i.e., without sand) is stronger than finely ground cement; but when used with sand, as in concrete and mortar, it was found that cement containing only twenty-five per cent of coarse cement particles had but half the strength of mortar mixed with fine cement, the cement used being in each case four weeks old. On the other hand, extremely fine sand diminished the strength of the mortar to less than one-half of that which was mixed with coarse sand.

COMPARATIVE HEALTH OF CITIES. — The Health Bureau of the German empire reports that during the week ending on the 27th of January last, the number of deaths to every hundred thousand of the inhabitants in the cities enumerated were as follows: —

Berlin	42	Copenhagen	58
Cologne	52	Stockholm	55
Magdeburg	56	Christiana	45
Strasburg	76	Warsaw	28
Munich	60	Naples	61
Augsburg	89	Turin	43
Dresden	38	Bucharest	59
Leipzig	34	London	40
Brunswick	41	Liverpool	55
Hamburg	48	Glasgow	49
Vienna	52	Dublin	58
Pesth	81	Edinburgh	41
Prague	95	Alexandria, Egypt	85
Amsterdam	56	Madras	121
Rotterdam	51	Bombay	65
The Hague	44	New York	47
Basle	65	Philadelphia	32
Brussels	49	Boston	37
Paris	53	San Francisco	58

JAPANESE ARCHÆOLOGY. — It is said that a Japanese antiquarian has discovered records of a diplomatic mission sent from Japan to Rome during the seventeenth century, — a fact that is of interest to us, as the expedition crossed the American Continent. If the records of the journey made by such keen observers are at all full, they may throw light on the state of civilization then existing in Mexico, where thus crossed. There are doubtless among the archives of the Japanese, records of inestimable interest and value to the historian and antiquary, and we trust that this reported "find" is but the forerunner of a series of valuable disclosures.

SAWDUST IN ROUGH-CASTING. — Siehr recommends very highly the use of sawdust in mortar, as superior even to hair for the prevention of cracking, and subsequent peeling off, of rough-casting under the action of storms and frost. His own house, exposed to prolonged storms on the seacoast, had patches of mortar to be renewed each spring; and, after trying without effect a number of substances to prevent it, he found sawdust perfectly satisfactory. It was first thoroughly dried, and sifted through an ordinary grain-sieve, to remove the larger particles. The mortar was made by mixing one part of cement, two of lime, two of sawdust, and five of sharp sand; the sawdust being first well mixed dry with the cement and sand.

CHANGEABLE WALL-PAPERS. — The *Papier-Zeitung* remarks that it would be an advantage if wall-papers could be had which would adapt themselves to the degree of illumination of the room in which they are hung, becoming darker with a greater brightness, and brighter as the darkness increased. The proposal has been made to coat the walls of rooms with oxalate of copper, which becomes dark in light, and bright again in darkness. By combination with other colors, wall-papers might be obtained which would present an agreeable variation of colors.

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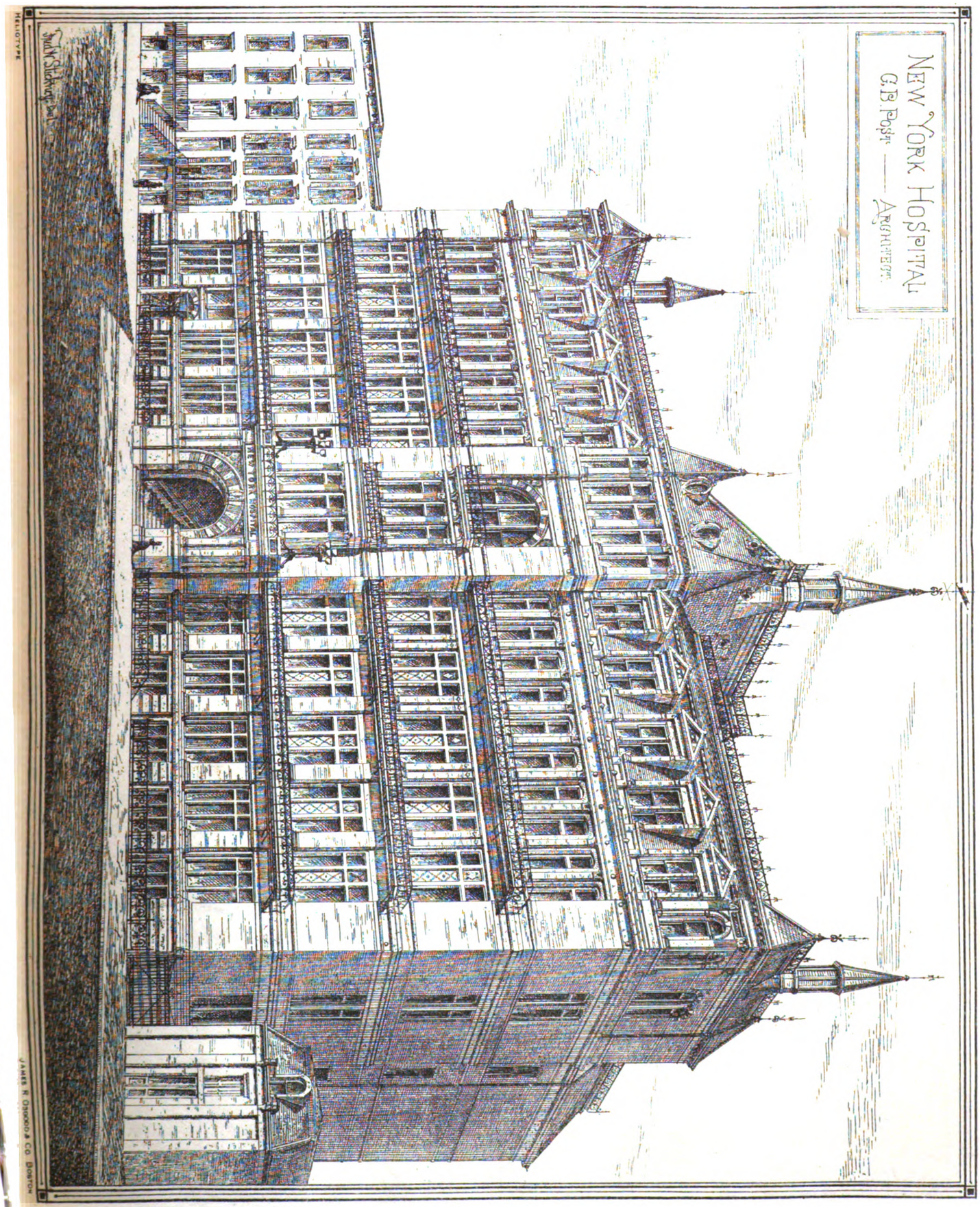

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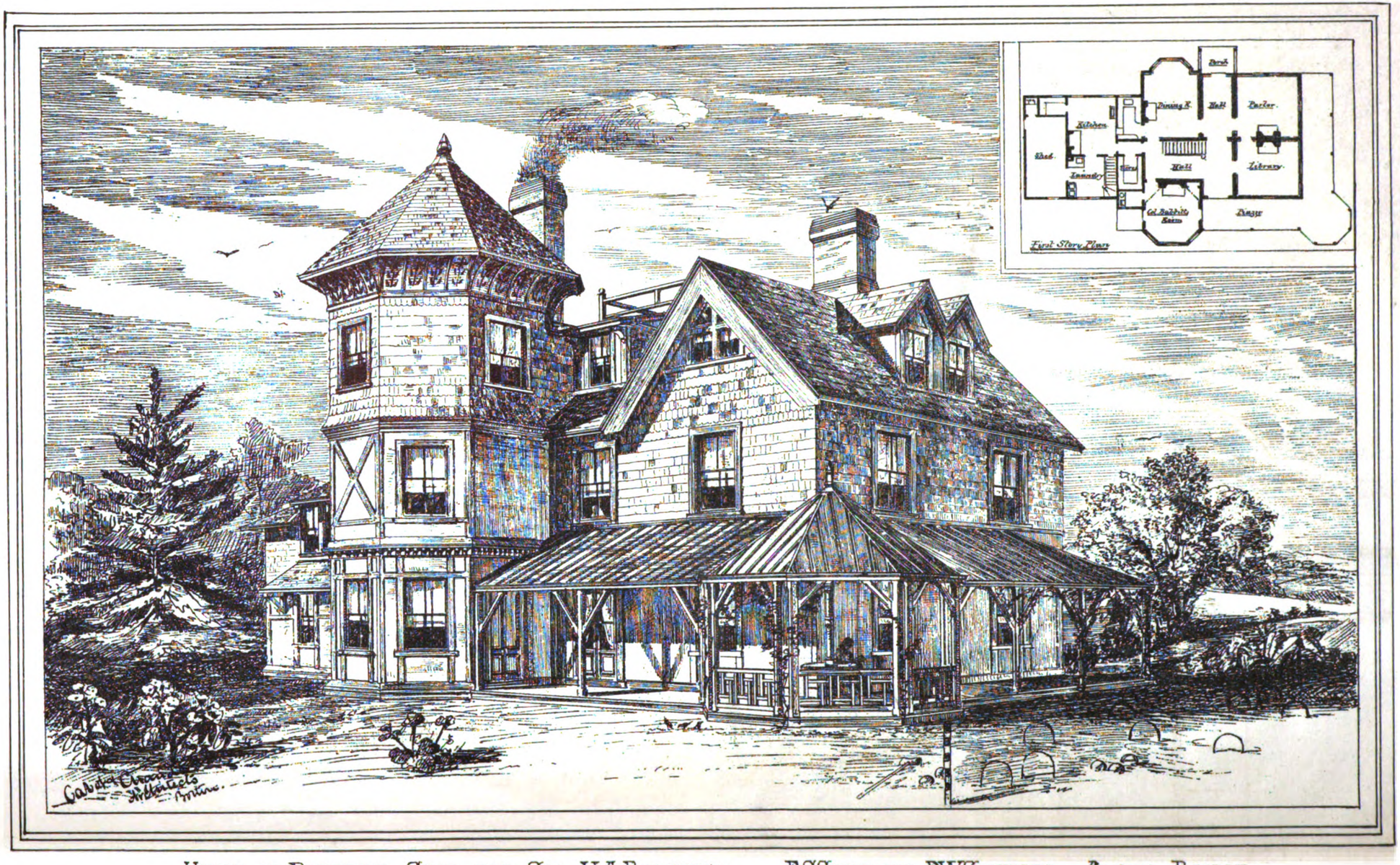

House at Pomfret, Conn. for Col H.A. Babbitt. E.C. Cabot and F.W. Chandler Archts, Boston.

Heliotype
James R. Osgood & Co. Boston

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STUDIES OF INTERIOR DECORATION PLATE II

Background of sea green very neutral. Large rosettes in buff. smaller rosettes in pale red. smallest rosettes in soft brown; all with brown outlines.

Damask of buff upon buff

Damask of pale green upon green ground

FIG. I.

FIG. II.

EDWARD T. DEWSON DEL.

Scale of ft. for Figs. I & II.

Leaves and branches of Orange tree in olive colors. with buff fruit and white blossoms on a damask background of sea green.

Field of buff toned down with black.

Shadow of field.

Red.

Scale of ft.

FIG. III.

Thick champfered mirror projecting from frame of dark Mahogany

Ebony beads around mirror

Carving mostly cut away to ground and interstices filled with red

SCONCE MIRROR

Scale of inches

CEILING DECORATION

HELIOTYPE

JAMES R. OSGOOD & CO. BOSTON

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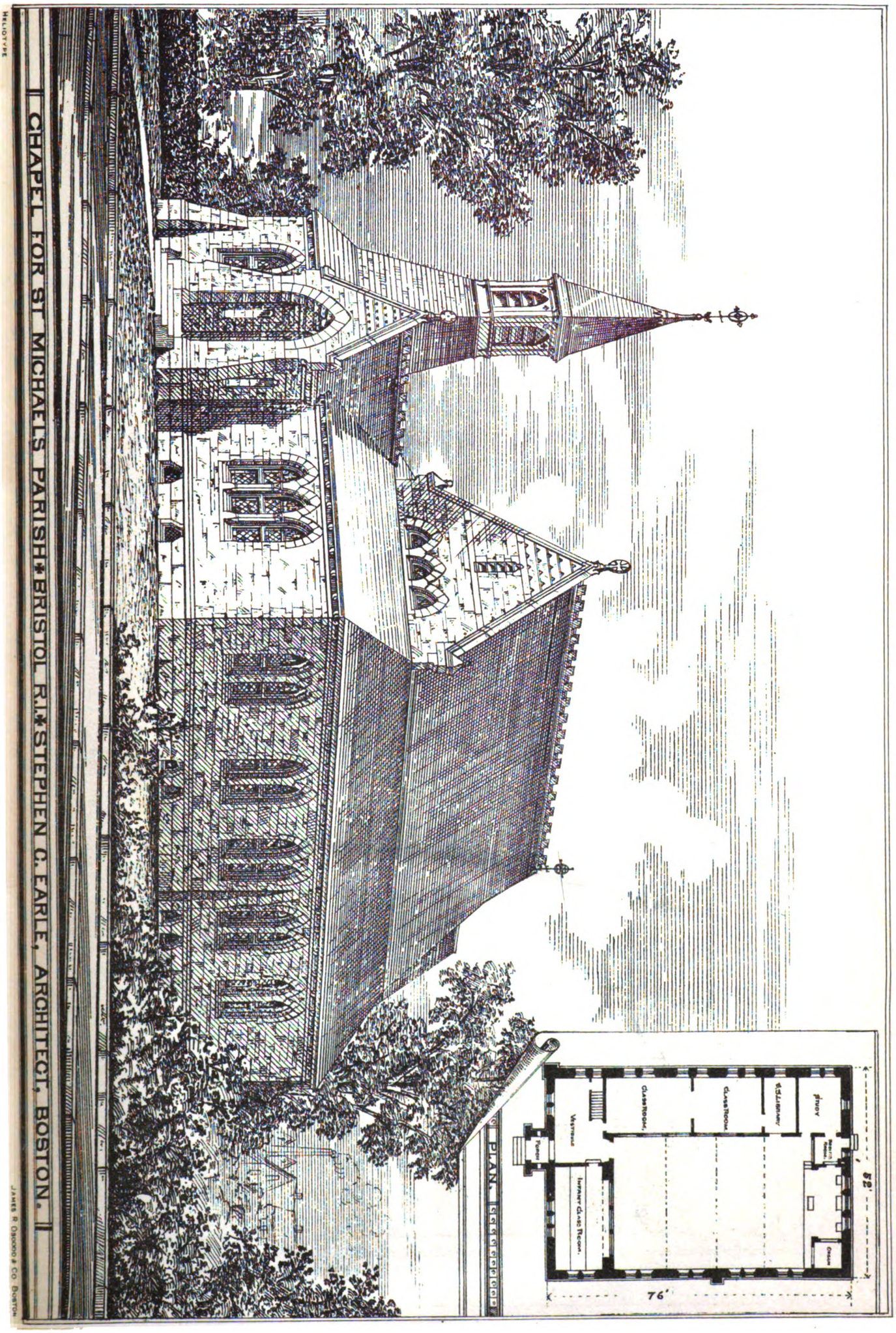

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, MARCH 24, 1877.

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THE question of building a new State House to take the place of that which is now promising to tumble down at Indianapolis has been decided by the Indiana Legislature in an act that will attract the attention of architects by one or two novel provisions. It directs the governor to appoint a board of four State House Commissioners, to whom he shall be a fifth, and who "shall be selected in equal number from the leading political parties of the State," which we take for an elegant way of saying that two shall be Republicans and two Democrats. The board is directed to build a new State House at a cost of not more than two millions of dollars, and is to make the choice of plans, select an architect, award contracts, disburse moneys, and in fact take the whole control of the work; they are to give security in the sum of twenty thousand dollars each (except the governor) for the faithful discharge of their duties, and that the cost of the building shall not exceed the two millions. They are ordered to call in at least one architect "of known skill and ability in his profession," who shall not be interested in the competitions for the design, and a civil engineer and a builder, with their advice and assistance to examine the designs, specifications, and estimates thus far submitted for a new building; and are authorized to select, and we suppose to adopt and carry out, one of the designs, returning the others to their authors. But if they do not consider any of the designs already submitted satisfactory, they are to open a new competition advertising it in the State and in the cities of New York, Boston, Philadelphia, Cincinnati, Chicago, Louisville, and St. Louis. Ninety days are to be allowed for sending in designs in the competition, which is to be decided with the assistance of three professionals as above provided; and if this competition does not procure a satisfactory design, another is to be opened, and another, "until a suitable plan is secured."

So far the commissioners' duties: the architects who compete must do so under rather singular conditions. They must submit sealed bids, stating the compensation for which they are willing to undertake the work. The architect whose plan is selected is to be employed to carry it out at a compensation to be hereafter fixed, and not to exceed three per cent. But he is to give bonds in the sum of a hundred thousand dollars that his "plan shall be complete and perfect for the purpose designed and intended, and that the building shall be fully completed and finished as a whole in every part," whatever that may mean, "for and within the price and cost estimated and fixed by such architect, and which price or cost shall be stated in his proposition or submission of a plan and specification." Furthermore no extra work is to be allowed beyond that provided for in the first estimates; and "should any be required, the architect shall do such work and furnish such material at his own cost, and furnish the work complete for the price estimated by such architect." It is made a felony for the members of the board or the architect or their representatives to be interested in any contract for the building, or any claim upon it except their regularly appointed compensation; and a fine of ten thousand dollars, with a possible term of two years in the State Prison, is made the penalty. There are so many things to be said about this rather anomalous act, that we shall defer our comments till our next number.

THE war over the New York State Capitol still continues, and the newspapers are busily engaged in it. The letter of some of the leading New York architects on the subject was published in our last issue. The jocose column of the *Times* has contained one or two articles against the action of the New York Chapter, which are more diverting than convincing. We have not seen the amended designs of the Advisory Board, and therefore do not know how far the juxtaposition of different styles to which we, like the rest of the profession, objected has been maintained. The popular discussion only tends to confirm our opinion on two or three points, — that the public cannot divorce the question of style from the question of planning and design; that it really does not care any thing about style, and if it only get the essential things it wants will leave the question of style to architects, provided these agree upon it; but that if architects show serious disagreement in matters which they seem to think important, the public will lose its respect either for the matter in dispute or for the professional opinions of architects, or both. We doubt if any occurrence in this generation has done more to weaken the general confidence in architects as architects, among those who have witnessed it, than this unlucky quarrel.

THE Boston Chapter of the American Institute of Architects continue their premiums to mechanics by advertising a second competition for their meeting in May, with a prize of fifty dollars as before. The subject this time is a wrought iron strap-hinge for a door, the work being of course all hand-work. The plate of mediæval ironwork which we give in this number may be useful as a suggestion of treatment to a possible competitor if our number should reach any such. We should be glad to see the example of the Boston architects followed elsewhere.

ARCHITECTS in England have since the time of Mr. Ayrton of happy memory, been kept on the defensive, and apparently much bestead to defend their calling. The architectural journals have hinted at an antagonism between their profession and the public; and as we know, there is an increasing crowd of amateurs who are eager to do their work for them better than they can do it. Dr. Richardson has shown them how they ought to build towns; Prof. Huxley gave us his unflattering opinion of them in a way that fixed our attention when he was here awhile ago; Sir Edmund Beckett has written them a treatise on their vocation; a second Country Parson has lately been exposing the misdoings of some of them in the *Times;* and now Mr. Bentinck, M.P., has delivered a lecture to his constituents on what he calls "The Decline and Fall of English Architecture." He began by laying it down as accepted and incontrovertible that at present architecture was distinctly going to the bad in England; that this was a subject of general remark, but that no one had been able to define either the cause or the remedy. Mr. Bentinck is ready with both. The cause, he says, was simply the Gothic revival. Sketching the chief phases of this revival through Pugin and Ruskin, and the Camden Society, whose weak spots he discovers and punctures with considerable effect, he expresses his opinion upon the style and on the later works of the day. Gothic building he thinks unsound and unskilful; Gothic architecture "cannot exist without shafts that give no real support, windows that admit no light, roofs of an unnecessary height of pitch, fronts that are merely screens, an overloaded ornamentation which may be likened to a 'tale told by an idiot, full of sound and fury, signifying nothing.'" It startles one like a cold shower-bath to see all these, the standing taunts of the revivalists against the Renaissance architects, hurled back upon their authors in this fashion. He quotes Mr. Fergusson's disparaging criticism of the new Museum at Ox

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ford; says of Mr. Waterhouse's famous Manchester Assize Courts that their architecture is "merely a hotch-potch of poor, foreign Gothic detail strung together without either unity of purpose or grandeur of effect;" speaks of the new Law Courts as "the huge and monstrous 'Palace of Justice' which is now rising into supreme ugliness on the west side of Temple Bar." For all these and many other deplorable offences which he recites, Mr. Bentinck has his decisive and easily applied panacea: "As we have now reached our second childhood in art, if we would not perish altogether we must needs submit to another birth, in short to another Renaissance"—that is, go back to the style of Inigo Jones and Wren, and start afresh.

IT is a characteristic of amateur writers upon art to ascribe to styles the excellences and the faults of the men who work in them. Mr. Bentinck tells his constituents that the cause of the Fall, as he likes to reiterate it, is the Gothic revival; but he does not say what was the cause of the revival, nor of the peculiar forms in which it has manifested itself. He is a good hater. He hates Gothic, and likes Renaissance; but he does not show that he knows any thing about either; nor does he say any thing to substantiate his liking or his disliking, or to show that the faults which irritate him or the beauties which he extols inhere in the styles to which he ascribes them. We quote him because he is a type of a kind of critic who is heard a good deal nowadays, and is not without his influence. His hearers may have been stimulated by his lively discourse, but they can hardly have been enlightened. Great questions of art are not so easily settled.

STILL there is no doubt that such opposition to the architectural profession or to its way of working as we have mentioned, really betokens something in England. Indications of it are too many to be set aside. He would do good service to the cause who should really trace out where lies the secret of the opposition, which seems to be stronger there than any where else. We should be very much surprised to find that a change of style would have any effect in lessening it, or that it had any thing to do with style. But if architects are wise, there and here, instead of resenting the popular disposition to interfere in their pursuits, they will be thankful for the interest it indicates, however distasteful the form in which it shows itself may be to them. Prof. Barry said wisely the other day, in opening his course of lectures at the Royal Academy, "In seeking progress we must have no fear of criticism. Even if it seem to us often one-sided and unfair, it is better than indifference. This is true in a special sense with regard to criticism of professional doings proceeding from laymen. Any thing is better than the resigned ignorance which proclaims, as if it were a merit, that it knows nothing of architecture." The popular disposition to interfere with architects should be regarded by them not as an obstruction, but as an opportunity. The world is too busy to meddle much with things that it does not care about; in the things that it does care about it is sure in the long run to have its own way. If it does not get what it wants from architects it will turn to somebody else. It will ascribe its disappointment to what is most conspicuous to its eyes, the style in which architects work, or the effort they make for architectural effect. What the public really wants is certain practical contrivances and arrangements, as yet only half-determined, for its use and comfort. For attaining these objects architects have every advantage by their training. When they convince the public, as they may, that they can do this better than anybody else, it will give them its confidence, and will doubtless be ready to accept a really satisfactory provision for its wants, in any architectural form on which they will agree, if only they can agree. Whenever there appears a serious tendency to talk of architects as obstructive, and to look for substitutes for them, it is time for them to take warning — and encouragement.

AMONG the interesting points in the recent developments of architecture in the United States has been a greater freedom than before in the treatment of brickwork. Things are done now every day in the handling of plain brick at which our bricklayers would have shaken their heads as impracticable ten years ago. The study of ornamental brickwork is a very wholesome one in the development of an architecture that has not fully taken shape, a legitimate and useful as well as an economical means of effect, and good training for the more difficult study of decoration in carved stonework. It has the advantage, too, of being in a considerable degree independent of style, except in the case of pretty elaborate cast or moulded work. A good use has been made lately of black brick; but the common process of blackening them by dipping in coal-tar, though cheap, produces neither satisfactory nor durable results. A good supply of moulded and colored brick has been greatly desired, but manufacturers have been rather slow to answer the wishes of architects in a matter that involved expense and possible risk. There have been in the market for some little time however more or less brick of both these kinds, and we are glad to see that they are coming into use. One or two Massachusetts manufacturers have supplied simple moulded forms; and two companies at Philadelphia, the Peerless and the Brick Enamelling Companies, have begun to furnish bricks in sundry ornamental forms and colors,—the former a variety of serviceable mouldings and plain ornaments, the latter, bricks coated with enamels of various colors. Specimens of the enamelled bricks that we have seen are good in color, with a surface apparently indestructible, and though rather too lustrous to have a good effect in the mass in conspicuous outside positions, are very well adapted for sparing use in ornamental work, and for interior walls wherever a smooth hard surface is desirable. The black bricks which we have seen were without lustre, and had an excellent surface for any use. The great irregularity in size of the brick used in different parts of the country is a serious inconvenience and an obstacle to the free use of brickwork. It hinders computations and comparisons, is a great annoyance to architects and builders who have work to do in different places, and a serious impediment to the introduction of ornamental brick. It is time that the evil should be corrected, as it might easily be if manufacturers would agree on standard sizes, and then, testing the shrinkage of their clays with a little care, shape their moulds accordingly.

WE notice that the New York Tribune does us the honor to consider us as the organ of the Institute, an honor which we must once more disclaim. The Institute makes us its medium of publication, and we hope to find ourselves in accord on most subjects with the opinions of considerate architects in the Institute and out of it; but we claim no official authority for what we say.

ARCHITECTURAL STUDENTS. — XI.

EXAMPLES OF RENDERING: ENGLISH.

THERE is no need of apology for pointing the student continually to foreign examples; for though there are a good many clever draughtsmen among us, there is as yet no such thing as an American school in drawing, nor is there any accessible body of published illustrations to which we can call attention as a standard. Until the *Sketch-Books* of the New York and Boston architects were begun three or four years ago, there had been no attempt at publishing architects' drawings, except in an isolated case now and then. A number of architectural books and periodicals had been issued from time to time, but they were illustrated either with woodcuts or with mechanically executed plates, serviceable merely as diagrams. The first American book we can call to mind which really illustrated an architect's way of working was Mr. Peabody's volume of clever but slight note-book sketches.

In point of fact, the influence which our draughtsmen mostly feel is English. The books they consult and the periodicals they read are English. The English architectural journals, appearing every week, furnish an enormous number of illustrations, the most of which are photolithographic copies of actual draughtsman's work in pen and ink. The general standard of these drawings is fortunately very good, though, as need hardly be said, many unsatisfactory ones are published. A certain proportion are crude and staring, or disfigured with awkwardly drawn accessories, or disagreeable in texture or effect; but most of them have the merit of showing the designs of the buildings clearly, and are drawn with precision and spirit. In point of thoroughness and

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care, they are very good models for draughtsmen who are tempted to a dashing manner. They are apt, like most pen-drawings, to be weak where tones are attempted, and for that reason to succeed best where there is but little tint, and where the light is so taken as to restrict the shadow to very small areas, leaving the pen to simply define the architectural form and detail, with such indication of texture as may be desirable. These shortcomings should be borne in mind in studying them. The desire for texture not unfrequently runs away with the draughtsman, and being undiscriminatingly indulged produces either an effect of dry all-over-ishness or a glaring, spotty look, both of which are disagreeable enough, though the second is the more offensive, and apparently the more contagious on this side the water. The stones of a wall in shade, for instance, are often hatched in with such energy as to thrust themselves out of the tint in which they belong; the skies are too apt to elbow their way into the foreground, and compete in ruggedness with the masonry under them; the trees and grass to look like bundles of shavings or chopped straw. The student therefore will choose his models with some care, selecting those that are straightforwardly and quietly drawn, clear without harshness, well kept together and subordinated; and looking for simplicity and significance rather than smartness in the drawing of the accessories, remembering that since these last need not be drawn at all, there is no excuse for either drawing them badly or making them conspicuous.

Among the illustrations of the *Building News* and of the *Architect* there are many instructive examples for the student. If he copies a few of them with care, he will soon learn to distinguish those in which the handling is significant and the touch exact, from those which are merely covered with dashes of the pen. Here and there he will find one which an architect of note, Mr. Street or Mr. Norman Shaw, for instance, has drawn with his own hand; and he will admire the directness, force, and picturesqueness with which these two remarkable draughtsmen render their work. We think we are not wrong in saying that most of the drawings of Mr. Norman Shaw's works which appear in the *Building News* must be made by himself; and there are no better studies for the rendering of designs of the picturesque character that is in favor nowadays. A well-known American architect tells us that every young draughtsman who is taken into his office is set at work copying Mr. Norman Shaw's drawings, and kept at it till he has learned to make good pen-drawings. We know of no better practice in its way. Not only are architectural form, detail, and texture made out with rare directness and decision, but the drawings are handled with admirable freedom and grace. Mr. Shaw delights to surround his country-seats with bits of landscape, which he sketches with great freshness and cleverness. The *picture* in the drawing is never lost sight of, though it is not allowed to obtrude itself to the detriment of the architecture. It is worth noticing how much richness and animation are secured without straining after effect or disturbing the quiet *ensemble* of the drawings. Mr. Shaw in fact draws at once like a painter and like an architect, and we may almost say designs as much like the first as like the second. The draughtsman may learn a lesson in forbearance from seeing how often he leaves his skies entirely blank, though it must be noticed that his buildings by their picturesquely broken sky-lines encourage this treatment of the drawings more than most.

Among the English works of architectural illustrations that are most often to be found in this country are the companion volumes of sketches by Messrs. Norman Shaw and Nesfield, which are familiar to a great many draughtsmen. Mr. Shaw's sketches are photolithographed, apparently from his own pencil-drawings; but they must evidently have been redrawn for the work, and have not the freshness of first sketches nor the charm of his pen-drawings. They are drawn with an uncompromisingly architectural eye and great sureness of hand, but with a cool hardness of execution that is disagreeable. Mr. Nesfield's are very like them in manner, but are done by lithographers, and are a little less rigid. These books will show the student what may be done in the way of clear illustration with an economical use of means, but are not of great value as examples. The copies which are sold in this country are, so far as we have seen, late impressions from worn stones, and must lack the vigorous clearness of the originals. Mr. Colling's books have considerable currency, perhaps more than any other books of modern English detail. The best in drawing are naturally those that are autographic, the "Art Foliage" for instance, we believe, in which the detail is rendered with great brilliancy and vivacity; nevertheless they have the fault which we often see in clever English drawing, of hard, angular, and unsympathetic handling. If however the draughtsman ever succeeds in achieving what Mr. Colling does, he may consider that he has accomplished a good deal, and there is then no reason why he should not accomplish something better. For pen-and-ink sketching of detail in a manner that is at once brilliant and sympathetic, and for rendering of interiors and decorative work, the student will find Mr. Talbert's drawings, which are pretty well known in this country, unsurpassed among the English. They are full of grace, spirit, and ease, are done with a consummate sense of picturesque effect, and with no waste of resources.

It is not so easy to get at examples of English brush-drawings, though there has been and still is a great deal of clever work done with the brush in England. We presume, however, that anybody who is travelling there would find that he could easily secure some good drawings; and it is at least desirable, as we said in respect to French drawings, that examples should be provided for the sake of study in our schools. The fact that it is only pen-drawings that are reproduced by publication, makes it hard to get copies of any others; but if the student can get, for instance, any photographs of the drawings submitted in the Law Courts competition, he will find them very much to his purpose. In this famous competition, which took place ten years or more ago, a dozen of the most distinguished English architects were invited to take part. Messrs. Street, Scott, Burges, Seddon, Waterhouse, Brandon, were among them; a premium of eight hundred pounds was allowed each of them, no pains was spared in the preparation of the designs, and the result was probably the most interesting collection of architectural drawings that was ever got together in England. Most of the architects, perhaps all of them, had their drawings photographed; and it is likely that copies of many of them may still be had by any one who will search for them. If the student can procure any of the photographs that were published a dozen years ago from the sketch-books of the younger Pugin, he may treasure them. Unhappily the publication was not made remunerative, and the negatives were soon destroyed, so that it became difficult to find copies.

As well-known examples, in striking contrast to the purely "architectonic" handling of drawings, which is always something of a snare to the architectural draughtsman, we may mention the drawings of Mr. Ruskin, which do not attract as much notice as they did once, but which nevertheless deserve the student's attention, if he can see them at their best in the English edition of "The Stones of Venice." They are the work of an artist in whom the painter is stronger than the architect, a sensitive draughtsman who gives more heed to the pictorial qualities of his subjects than to their elements of form. For this very reason they are worth the draughtsman's study. The drawings, made usually with the brush, are ably rendered by the engravers; and it will often be seen that the attention bestowed on picturesque effect and color and texture, is taken from the architectural form. For example, if he has it at hand, the sixteenth plate in the second volume of "The Stones of Venice" (Windows of the Fourth Order), is a charming bit of artistic effect and texture, drawn with much feeling, in which the professional eye sees at once that the ogee archivolts are badly out of drawing. So in many of the capitals, though the detail is drawn with great refinement, the shape of the mass is wrong. Against these faults the student should be on his guard; but if he will study them with this reservation, he will find a wholesome antidote to coarseness and hardness of treatment in the refined charm of the drawings, which is almost unequalled.

It is worth the student's while not to limit himself to what he finds in the work of the day. A good many English artists have taken delight in drawing architecture. Prout's works will furnish him most valuable instruction, and there are often opportunities of picking up his books or separate prints. Many of his drawings have been chromolithographed with very good success. They are not valuable for

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strictly architectural study, for their detail is negligently drawn; but as studies of the management of a drawing, for sense of composition, skill in handling, and mastery of broad, rich, quiet, and yet brilliant light and shade, they are absolutely unrivalled. Occasionally copies are to be found of a small work by Prout on Light, Shade, and Composition. They may be seized upon as prizes, and will prove instructors of rare value. Illustrations by Harding, Stanfield, Nash, and Roberts, which may often be found, will be useful examples. The lithotint process, invented by Hullmandel some thirty years ago, made it possible to make drawings on stone with the brush, and print them like other lithographic drawings. "The Baronial Halls of England" contains a series of Harding's drawings by this process, which are admirable studies in architectural sketching. It was soon disused on account, we believe, of some difficulty in printing; which is much to be regretted, since the results obtained by it were admirable. We could wish it might prove possible to revive it.

Of German examples there are not so many within reach of the American student. The *Architektonisches Skizzen-Buch*, however, is often met with, and occasionally contains very clever bits of rendering. We may mention as exceptionally skilful in their way a portfolio of sketches — *Reise Skizzen* — by Prof. Dollinger. They are as "architectonic" and unpictorial as any thing in the way of free sketching can well be, and are rather hard and meagre in handling, but are done with remarkable directness, conciseness, and certainty of hand, and the utmost economy of means, giving therefore an example of what may be accomplished by a traveller to whom time is precious, with the least possible expenditure of it.

There is in fact an abundance of example for the student who will avail of it. We earnestly counsel him not to limit himself to the ordinary routine of work which he will encounter in practice, but to make himself familiar with as wide a range as he can, and study by carefully copying from a variety of models. It will not only increase his skill in rendering, and give him command of various methods, but help to quicken his artistic apprehension in every department of the complex art which he has set himself to master.

STUDIES OF INTERIOR DECORATION.

IV.

OUR readers will recall the fact that in fixing upon a reasonable theory for the decoration or rather the completion of the room which is the present subject of our studies, we found it essential to eliminate from it two masses of white which by reason of their sharpness of outline formed an element of discord in our harmony of colors. One of these masses — the ceiling — was by a certain treatment of color, as explained in our last paper, brought into proper relation with the walls. The other — a white marble mantel — remains to be considered.

If this feature had less of the modern perfection and sharpness of workmanship, and had taken upon itself somewhat of the soft yellowness of age, it would exact less of our attention, and our system of decoration might possibly be "worked up" to it; or we might veil its elegant mediocrity with a judicious lambrequin or valence, throwing its whiteness into shadow by the arts of the upholsterer. Either of these expedients would involve the sacrifice of an opportunity. We desire to express in this room the idea of perfect hospitality; but a white marble mantel, fresh, dazzling, and smartly designed, gives but cold comfort, by whatever device we may try to soften its outlines and blend it with the walls. It remains monumental and intrusive.

The fireside is the natural centre of the apartment, and in considering the question of the furniture, we naturally turn to it first of all in search of a *motif*. Now we have treated our wall-screen with neutral colors to serve as a background; against this, light objects will be better defined than dark. They will present a more lively and agreeable contrast, and thus serve to create that brightness and animation of aspect with which we are to counteract the natural gloom of the north room. White marble being rejected, we turn to light woods, the natural tones of which, when treated with shellac or wax finish, become in themselves sufficiently neutral to blend with the background without loss of that play of light upon dark which we have found to be desirable. The room is almost a boudoir; it is a lady's parlor; refinement and delicacy of finish are evidently essential. Any wood like oak, ash, or butternut, the principal beauty of which when finished resides in its natural expression of strength or durability, as shown in its knotty texture and vigorous grain, would be out of keeping. We must either cover our wood-surface with a dead mat of applied color in delicate contrasts, with panels painted in designs to give them interest; or we must select a wood like maple, which will give us a satin finish and but a faint play of grain under the polish, evident rather in tones than in texture. A surface like this is better fitted to receive at the hands of the carver a treatment of such fine and even fastidious decoration as our circumstances would seem to require, than that of the coarser woods, whose natural strength and beauty of grain would compete unfavorably with these precise and dainty effects of art. Let this desirable quality then determine our choice of wood in this case.

We have discovered that as regards a composition of color-decoration, repetition or echo is an important element of harmony. Thus we have carried somewhat of the redness of our carpet into the dado; we have exaggerated it sharply in the narrow belt over the dado; we have repeated it faintly here and there in the neutral wall-screen, and it is echoed in the fillets of the cornice, and in the panel-moulding of the ceiling. In the same manner we have repeated black and gold in the lines of division with various degrees of breadth and sharpness. Following the same impulse, we have prepared for the use of maple in our furniture by employing the same wood in the broad flat mouldings which separate the wall-screen from the frieze above and from the dado-belt below; but in order to soften the contrast of colors thus created, the outer members of these wood mouldings are finished in black or "ebonized."

Now this maple-wood when finished or mellowed by time and use, will assume the color of old ivory. This introduces, especially about the chimney-breast, and wherever else any fixed pieces of furniture are used, a new element of color occurring in masses. In order to prevent these masses from having too great a preponderance in the room, and to harmonize them with the background, it is necessary not only to use their material on the wall-surface, but we must in some way break up the masses themselves by a repetition of the wall-colors. To this end, let the carvings of our panels, if in relief, have a background of that low tone of red which here and there gives character to our walls; or if in intaglio or engraved, let this engraving be defined with the same color. The panels thus emphasized may then each be framed in with a narrow line of ebony recalling the treatment of the horizontal lines of division on our walls. By this interchange of *motifs* we may hope to approach that complete concord of color which is an essential part of the ideal "fitness" of the room.

It may be remembered that the original conditions for the completion of this room included the requirement that it should be fitted to accommodate a few cabinet pictures and a small collection of books. We have made due provision for the former upon our walls; the latter must afford a *raison d'être* for a certain part of our furniture; and the idea is suggested that the fireside, around which books are most apt to be used, may itself be fitted to receive a few choice volumes, and thus gain a new interest of hospitality, and a new attraction of color in the rich leather and gilding of their bindings.

Thus we are providing for a chimney-piece, not merely a mantel; but in so doing, in view of the lively contrast of color which still exists between the woodwork and the wall, we must be cautious not to overpower the room with too imposing a mass of furniture at this point. Evidently it should not be carried high enough entirely to interrupt the characteristic features of the walls; for the sake of unity we should "feel" the neutral wall-screen above it, and the frieze should be continued quite around the chimney-breast. Moreover, it is only a few favorite volumes which we propose thus to enshrine: we are not contriving a library, and do not propose to give a literary atmosphere to a room which is merely an elegant *salon*. We have thus imposed upon us certain rational limitations of height.

These considerations have supplied us with a definite starting-point or *motif*, from which the design in Plate III. has been developed. It would be difficult, even if it were desirable, to enter with greater detail into the processes of this development. It may be worth while, however, to say that the idea of stopping the horizontal lines of our chimney-piece against the ends of two book-cases which are set with their backs against the returns of the chimney-breast, is encouraged by the space thus afforded on these exposed ends for long vertical panels, which form appropriate flanking features. These panels are an inviting field for dainty decoration by engraving in the manner suggested by our conditions, and they recall to mind the Raphaelesque treatment of such panels in the Vatican and elsewhere in Italian and French Renaissance. This in turn gives the cue for the adoption of Renaissance *motifs* in our little composition; hence the pediments; and these, being crowning features, and by their structure affording deeper panels, we fill with sculptured ornamentation in high relief against a red background. The spandrel-panels are treated in the same way, but with flatter relief, so as to avoid a transition too abrupt between the treatment of the panels in the lower and upper parts of the design.

This result of our studies is of course but one of many which are possible from the same premises; these results, while remaining equally loyal to the conditions of material, size, character of structure, practical use, style and methods of decoration by carving and color, will vary one from the other according to the difference in the temperament, mood, inspiration, or genius of the designer. In fact, we should not be engaged in a work of art at all, but in one of science, if our process of reasoning must neces-

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sarily terminate in a positive or exact conclusion. The object of this process or analysis is to define the conditions, to establish reasonable limitations, under which and within which invention or taste may be guided to conclusions of perfect fitness. In short, it is to elevate the work of decoration, however simple and commonplace the theme, into the region of art. If in the present case we may seem to have employed a machinery somewhat too complicated and ponderous for a conclusion so comparatively insignificant, it is to be borne in mind that we are attempting, in the interest of art, to establish certain principles or methods of design, and that this cannot be done without detailed explanations. The operations of the mind, while engaged in the production of a work of art, are of such a nature as often to elude analysis, and are rather to be "felt" than to be set forth in words. But as interior decorations and furniture, by which we are constantly surrounded, are peculiarly subject to caprice and the vagaries of fashion, it would be worth while, even at the expense of considerable time and space, to ascertain whether such mere matters of comfort and convenience are really worth the serious consideration of intelligent people, whether they are capable of being treated as works of art at all, and if so, by what processes of reason are we to form our ideals regarding them.

H. V. B.

THE ILLUSTRATIONS.

EXAMPLES OF MEDIÆVAL WROUGHT-IRON WORK.

FIGS. I. to VI. inclusive are taken from M. Viollet-le-Duc's *Dictionnaire Raisonnée de l'Architecture Française*. Figs. I. and II. are from the Cathedral of Notre Dame, Paris. Fig. III. is of eleventh-century work. Fig. V. from the church of St. Saturnin, at Moulis, Gironde. Fig. VI. is of thirteenth-century work. The other examples are taken from different sources, but chiefly from Mr. Talbert's works. Fig. X. comes from Barlavington Church. Fig. XI. is from Chichester Cathedral, and Fig. XIII. is from Chester Cathedral.

STUDIES OF INTERIOR DECORATION. — III. FIREPLACE IN THE HOUSE OF MR. THEO. CHASE, BOSTON, MASS.

See preceding article.

DINING-ROOM FIREPLACE. DRAWING-ROOM.

These plates are taken from Mr. B. J. Talbert's second volume.

MR. TALBERT'S DESIGNS FOR INTERIOR DECORATION.

THE last plate in Mr. B. J. Talbert's well-known work on Gothic forms applied to furniture,[1] published ten years ago, is numbered 30. The first plate in the same author's new work,[2] just reprinted by J. R. Osgood & Co., is numbered 31. But although the new plates are thus numbered in continuous succession from the old, they no longer exhibit a strict adherence to mediæval forms, but show by gradual development the increasing influence of the phenomenal revival of late Tudor and of Jacobean forms in England. The trefoils and quatrefoils, the cuspidated openings, the billeted and notched mouldings, the crockets, finials, and gablets of the neo-Gothic, give place to the carved pilasters and entablatures, the mimic balustrades, the twisted and tumid pillars, the heavy round drops, and the other characteristic features of the interiors of the seventeenth century. But in whatever dialect Mr. Talbert chooses to clothe his thoughts, they are always expressed correctly and with elegance. He is no blind follower of fashion, and his theories of truth of construction are as obvious in his later designs as in his earlier. No mere archaism of Crewe Hall, no caprice of Hatfield House, or awkwardness of Audley End, is sufficiently venerable to be imitated in these new designs. In his careful drawings of some original Jacobean furniture, in Plate 36, he gives us the "shaped" arms of certain old chairs and settles, but he is careful not to repeat them in his own work. His theory of the proper use of "the styles" in interior decoration is best given in his own excellent and well-chosen words: —

"It seems the more sensible idea to have for our daily wants furniture which is not monumental. Let it be familiar in feeling, without trying to be grand and pretentious; and let there be as little aping of a building style as possible. Of course there are exceptions to this rule, such as when adding to an old mansion, or when under the conditions of church work. It is probably true that a strong artist can create a good design in imitation of any period; yet the very gist of it may lie in an unconscious departure from the precedent, even though the details may be most carefully kept in the same spirit. In particular circumstances this power and knowledge are necessary, but it is seldom so with furniture for domestic purposes; for which reason a free style is advocated as preferable to an elaborate reproduction of the past, with just as little originality as there is much labor. A new thought expressed in carving, as simply as you choose, is worth a great deal of this imitation of a certain date. But it must not be supposed that new thoughts are common, or easily got at; on the contrary, it would be much less troublesome to turn antiquarian pure and simple. The man who wishes to design well must needs have a great knowledge of, and a great reverence for, the good work of the past ages, even though he may believe that their days are not ours, and that the giving of our best efforts to meet the present wants, if honestly done, will likely be correct."

Crede experto. We trust that the innumerable army of designers who will immediately proceed to crib their inspirations out of these new pages to meet the fashionable demands for novelty, even as they have used the former book in their late mediæval masquerades, will dwell upon these words, and will bear in mind that a new thought — a new *motif* — is not to be eagerly appropriated as an acquisition to their resources of design because of its novelty merely; its value is in its fitness for use, in its applicability to the case in hand. The commentators of Milton load their footnotes with parallel passages from preceding writers; but to these passages the poet never failed to give a new significance especially adapted to the elucidation or embellishment of his thought. A balustrade of John Thorpe, a panel of Grinling Gibbons, a pediment of Jean Lepautre, are excellent things in their way, but they are not to be quoted verbatim in modern work: let them rather, if used again, submit to such fine modifications that our work will be the better for them, and its convenience and suitability expressed with greater emphasis.

Perhaps the main interest of Mr. Talbert's new work is in the last eight designs, which are all "Academy drawings," exhibited in successive exhibitions from 1870 to 1876 inclusive. These have all those qualities of originality, fertility, and ingenuity, set forth with excellent draughtsmanship, which rendered some three or four of the plates in the first book so interesting to the public, and so useful to designers. Seven of these are ideal interiors, — vestibules, staircase-halls, dining-room, and saloons, — presented either in geometrical elevation, or in picturesque perspective. They are all more or less pompous, busy, self-conscious, and overloaded, but for this very reason the more acceptable perhaps as presenting the greater variety of detail to be considered. They appear like studies for stage scenery, intended to "furnish" its large expanse with their multitudinous suggestions, and to give impracticable promise of greater things in the apartments beyond. No space or point capable of receiving a decoration is neglected; and the result is, in several of these compositions, a want of subordination of parts, and consequently of repose and true elegance. But the details are ingenious, original, and remarkably well drawn. The designs are, in short, mostly academical and to a certain extent conventional in character, and as such should be judged.

With regard to the present edition, it is important to note that several of the heliotype reproductions belie the delicacy of the lines as they appear in the original, and destroy the true values of light and shade. It is a pity to see these fine effects misinterpreted by hasty workmanship. We sincerely trust that, as more copies are printed, the publishers will see to it that these errors are remedied, and that in respect to its mechanical execution, this valuable work is properly presented.

THE CHICAGO CUSTOM-HOUSE.

NEW YORK, March 13, 1877.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Sir, — In your issue of March 3 I find a statement in your correspondence from Chicago which I desire to correct. In speaking of the new Custom-House and the changes lately made in the design of the upper story, your correspondent goes on to say that "there is no evidence yet of those terrible catastrophes which the first examining commission considered inevitable, notwithstanding that *nothing has been done to those terribly berated foundations*." That a subject so thoroughly ventilated by the press should have escaped the notice of your correspondent is surprising, for there was hardly a newspaper in Chicago, at the time the additions were made to these foundations, which did not freely comment upon the fact.

When the third Commission, appointed jointly by President Grant and Secretary Bristow, reported to the latter the result of their investigations, they made certain recommendations, one of which was to fill in with concrete four feet thick the spaces between the concrete under the main walls and the concrete under the area walls, and such "voids" under the main and angle pavilions as were not concreted. By direction of the Secretary of the Treasury as contained in his indorsement of this report in referring it to the Supervising Architect, I ordered this additional concrete laid; and it was laid, in all, several thousand yards, thus greatly increasing the efficiency of the foundations. A curious fact was presented when digging the trenches for the new concrete. The perpendicular sides of the old bed of concrete, or what should have been perpendicular sides, were found to incline inwards towards the centre of the walls, thus giving the under side of the concrete a bearing surface on the soil in some places eighteen inches less in width than the upper surface under the footings. This was without doubt the result of carelessness in first setting the concrete. The trenches were not properly curbed, if curbed at all, and this

[1] Gothic Forms applied to Furniture, Metal-Work, and Decoration for Domestic Purposes. By B. J. Talbert, Architect. James R. Osgood & Co., Boston, 1873.
[2] Examples of Ancient and Modern Furniture, Metal-Work, Tapestries, Decorations, etc. By B. J. Talbert, Architect. James R. Osgood & Co., Boston, 1877.

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wedge-like shape of the concrete was caused by the falling in of the sides. What was a very serious defect turned out in the end to be a great advantage, for when the new concrete was set on the outside and inside of the old, the old concrete was in form like a key-stone, and it was under precisely the same conditions. This addition to the foundations has undoubtedly greatly increased their bearing capacity. Possibly your correspondent is not aware that the walls throughout have been reduced in thickness, and many of them built hollow. With the additions to the foundations and the reduction of weights, the conditions, as the building now stands, are so different from those upon which the report of the first Commission was based, that any inference from the passage above quoted reflecting on the judgment of the gentlemen forming the commission is unfair and unwarrantable in view of the existing facts.

Although having no connection with this or any other government building now, at the time this report was made I held the position of Supervising Architect; and I make this correction in justice to myself, for at the time it was pretty generally known what the recommendations of the third Commission were, and that I was directed by the Secretary of the Treasury to see them carried out.

This statement of your correspondent, coming from the very spot, would seem to show me as having neglected specific instructions in a matter of great moment. I am

Yours very respectfully,

WM. A. POTTER.

THE DRAINAGE OF COUNTRY HOUSES.

EDITOR AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — Mr. Bayles, in his letter published in your issue of 10th inst., intimates that the reasoning contained in my last communication was predicated on "imperfect data," for the reason that "the consumption of water in cities is certainly no standard by which to judge the consumption per head in country houses depending upon wells and cisterns;" and he refers to Col. Waring's estimate as more nearly correct. My statement gave an average consumption per head per day of thirty-eight gallons; while Col. Waring's (in referring to a case in which "there is no public water supply"), was thirty gallons. But by reference to my letter published in your issue of Dec. 16, 1876, with which this discussion commenced, Mr. Bayles will learn that the question therein proposed was that of "the disposition of sewage from a country house, where there is no town drainage available, where the surrounding grounds are level, and *where there is a street water-supply.*" On these data I maintain that my reasoning was correct; and, indeed, my own observation is to the effect that where there is an abundant water service, the average consumption per head is usually much more than thirty-eight gallons daily.

The problem I originally suggested is one of great importance; but I think it has been somewhat lost sight of in some of the recent communications. In my own limited experience I know of four towns, the populations of which range from 3,000 to 10,000, in which a public water-supply has been introduced for years without any corresponding provision for the removal of sewage. Indeed, even the city of New Haven, which has long had a water supply, was only efficiently sewered within the past eight years.

Without discussion I will concede that these conditions are intolerable, that a sewerage system should be contemporaneous with a water service, and that the introduction of the latter should in many instances be legally prohibited unless accompanied by the former; but this does not alter the fact that in hundreds of places precisely these most objectionable conditions obtain, and probably will obtain for years to come. The question I have asked is, How, under these conditions, *and at moderate cost*, can the average householder make himself most secure against zymotic diseases originating from decomposing sewage?

Mr. Bayles adds other pertinent objections to those I have previously made against the irrigation system urged by Col. Waring as so universally applicable; and I think it must be conceded that this system cannot be extensively relied upon *for use on private grounds* of small extent, particularly in our Northern States. At the risk of appearing too confident in my own judgment, as opposed to that of persons who have made a much more thorough study of this subject than I have been able to, I will say further, that the alternative system to which Mr. Bayles has committed himself — viz., the use of tight cesspools — seems to be equally inadmissible, for the reasons stated in my letter published in your number of 17th ult.

This is eminently a case in which it is easier to make objections than to give advice; but the subject is one, the importance of which, although but little recognized, cannot be over-estimated; and I sincerely trust that its discussion in your columns may lead to a better solution of it than has yet been offered.

Respectfully, HENRY R. TOWNE.

STAMFORD, March 13, 1877.

THE ZODTCHY. — The monthly issue (illustrated) of the Russian architectural journal, the *Zodtchy*, is to be printed in Russian and French.

THE ETHICS OF CONTRACTING.

CONTRACTORS of experience know that in cases where there are but few competitors, if the works are at all complicated, mistakes made by bidders frequently occur, either in omission of portions of the labor or material, or both, or in the computation. Through inexperience, the mistake is often in undervaluing the cost of labor and quantity of material. It follows that the chances of such mistakes increase in the same ratio to the number of bidders. But the mistake having been made and the bids becoming public, a false pride prevents the bidder from "backing out," even on discovering the mistake.

In the competition for public works, there are two other classes of bidders, — one that bids with dishonest intentions, calculating in making up the bid the item of "scamping the job;" and one that bids in ignorance of the nature of the work for which the bids are offered. A bidder of this last class may be seen hanging around the office of the architect, or wherever the contractors may be engaged in figuring the job, picking up such information as he can to make his bid upon. Thus it will be seen how it often happens that contracts are let below cost — that is, if the cost of actually fulfilling the demands of the specifications is computed. Now comes the rub. The successful bidder has become the contractor either through a mistake or dishonest intentions. The effect is much the same upon the building in either case. Satisfied that the work has been undertaken too low, it is slighted at every point possible. The owner, in case of private work, is often his own superintendent. He is satisfied, through ignorance, with the work as it proceeds, but awakes to unpleasant discoveries during a storm, when the rain comes through the ceiling, the winds undulate the carpets, and the perfume of drains permeate the parlors. Then we hear the outcry against dishonest contractors; and unfortunately for the class, the charge has good foundation.

It sometimes occurs that a contractor will perform his contract honestly, even with the knowledge that he is losing money; this is the case much oftener than the public will give him credit for. It will not require a professor of political economy to understand that this course cannot long be continued. To pay out more than is received would soon result in the man being no longer a contractor.

On the other hand, an owner of a building cannot, as a rule, get more than he pays for. To educate the public conscience to a higher standard of value received than it at present knows, would soon do away with the charge of "dishonest contractors." We get — and can only get — what we pay for. Within the past few years contracts have been frequently let — perhaps it will not be saying too much, that they have been usually let — at less than cost; that is, if the specifications were strictly fulfilled. This applies to both public and private work, and necessarily implies the general bankruptcy of contractors, or a general slighting of the work. Contractors of over twenty-five years' practice in their business, and still actively engaged in it, in this city, who have the reputation of uniformly performing contracts with the utmost fidelity, have been in these last few years almost unable to obtain a contract either public or private. Private work alone was possible for the faithful contractor, and that only when the owner or the agent took proper means to bar out the dishonest and incapable bidders. The consequences of this method of undervaluation are plain enough to be seen. The work is improperly done, to enable the contractor to get through with as little loss as possible. One of the worst features of this method is the nonchalance with which contractors generally come to treat it. "He got what he paid for," is the usual remark among them; and this is true, but none the less unfortunate. Their curt, rough, outspoken remarks contain the germ of the whole truth. Every cheap and flimsy house bears witness to it. The manifold imperfections in both the plans and specifications multiply in the construction of the building. Cheap plans are first sought, then cheap contractors; the result is a cheap house. The cheapening system prepares the way for slighted work. The one follows the other as night follows day. Those making the demand, however, are, strangely enough, disappointed. They expected to get more than they paid for. They have only been buying a house of Peter Funk, that is all; but again comes the outcry against "dishonest contractors."

A conversation heard while riding in the street-cars not long since would seem to answer this question: —

"How much did your house cost?"

The sum was named.

"That's very cheap, is it not?"

"Oh, yes [smiling], that fellow lost money by my house. It *is* a cheap house, — very cheap, sir."

The possessor of that cheap house — and it is a cheap house — chuckles, and wraps his warm overcoat around him with a sense of supreme satisfaction, while "that fellow" who "lost money by my [his] house" wears a coat too thin for this zero weather. The man so pleased with himself for over-reaching is living in a house, and calls it "my house," that was built by subscription, — the workingman subscribing muscle, the merchant material. "That fellow" is digging away at another cheap house, slighting it all he can, trying to scrimp enough out of it to pay for material that went into the "very cheap house, sir."

The too common practice of bringing into competition with this class of contractors those who are known to habitually slight their

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work, although capable of doing good work, and those who have neither experience nor ability, incapable under any circumstances of performing good work, has a tendency to lower the character of contractors generally, and deteriorate the standard of good work. Every man in the building business who has been a resident of this city twenty years and upward well knows the inferior manner in which work on buildings assumed to be first-class is to-day performed compared to that which they saw done in years past. No other men lament the decline in good, substantial work so much as they, for no other class of men so well understand the general deteriorating influences. And yet these very men must perforce adopt the methods in vogue, or get out of the way. In Rome one must do as the Romans do, is true in this case. A contractor who relies entirely upon making a living by doing good, honest work will starve in less than a year. The men who are willing to pay for such work are few and far between, and these few are not always building. Therefore all must fall into line unless some other occupation offers by which a living can be made; and but few contractors know any other way than the one which has been a life-work with them. They must make the best of their own business, whatever be the consequences. One of the strongest influences at work in extending the worst features of the present system of contracting in the building business is the natural aptitude of people to compare the cost of two buildings by their relative size. The average man, who pays for a house measures its value by the number of stories and the superficial feet of ground it covers. To him a house is a house. There are big houses and little houses. John Smith's is as large as mine, and it only cost so much. An architect and builder knows what this talk means, and down goes the character of the house in accord with John Smith's house. After that, no house in the city of the same size must cost any more, all the better if a little less. The character of the work is thus fixed by the cost. Houses are like men: it is easier to lower the character of either than to raise it. It is not certain but that the elevation or depression of the one will be correspondingly accompanied by the other. The general notion held as to the character of the average contractor would seem to sustain this idea; for that a general depression in the character of the work on buildings has taken place, is true, whatever may be assigned as the cause. — *Milwaukee Sentinel.*

MR. WHISTLER'S "PEACOCK ROOM."

THE *Architect* furnishes us the following account of a room in a house at South Kensington decorated by Mr. Whistler: —

"This new room is to be used as a dining-room, and measures about thirty-five feet long, twenty feet wide, and fourteen feet high. There is a fireplace at one end. If we stand in front of this, we have a door at each end of the side wall to the right, three windows in the side wall to the left, and constructively a flat ceiling. Not bad conditions by any means for any scheme of decoration; and had the room presented to the painter this arrangement in its simplest possible form, so that it should have been left to him to design all the architectural detail, or to associate with himself some architect who could and would have worked with and for him, we might have had a complete exhibition of the artist's power as a composer of *opera* in color decoration, a full realization of his "Harmony in Blue and Gold." It may seem a little bit strange that I should suggest the submission of the architect to the painter, in opposition to the many words I have written tending all the other way. But, apart from my belief that architects have not of late kept pace with painters, that they are not so worthy of the consideration for which I once pleaded, this room was emphatically a case where the painter should have been sole director from the first. That he was not, is the one fact to be regretted. For we cannot fail to observe that there are Queen Anne sashes with small panes and heavy moulded bars in the two side windows, and a French casement with larger panes in the centre opening. It is noticeable that the planes of the windows come down to the floor without window-board or window-seat, and that the shutters, like the doors, are not at all like Queen Anne, but are of the vernacular Kensington type — two panels in height. I may here note in passing that the upper panels of the door farthest from the fireplace — the door leading into the serving-room — are filled with a glazed trellis, consisting of patterns common enough in mediæval work whether in Europe or Japan, and not indeed wholly unknown to the Greek and the Egyptian. One of these is the square intersecting matting pattern; the other is that alternation of semicircles which may be equally well described as the scale pattern or the feather pattern, but which also might just as well have been evolved from a wave or a flower. Features like this belong to no particular country, no particular style, for they are the common property of the world wherever birds or fish are found. I place some stress on this because we shall have to recur to this pattern again. To return to the architectural features: there is a three-foot wood dado two panels high (the upper one being square or nearly so); these panels are narrow, and thus numerous, and the framing is broad and moulded. Above this we get the *effect* of a second dado, the leading or most prominent shelf of a series being placed at about six feet from the floor. The shelves, of very thin wood supported by numerous light uprights of square section, *cover* the walls to the ceiling, except over the fireplace, over the sideboard, and in a small space over the dado in the centre of the wall opposite the windows. These shelves are intended for china. The cornice is small and cove-like, and the ceiling is divided by flat small ribs into the eight-pointed star pattern so very common in Elizabethan and Jacobean work; the ribs are arranged so as to produce two rows of four stars each; and in the centre of every star the ribs descend pendantwise, with any thing but an easy curvature, to terminate in gas-lanterns. The woodwork is of walnut, and the upper part of the walls was covered with stamped leather of the sprawling rococo patterns with which we are unfortunately too familiar. Such was the room. With blue paint, Dutch metal, gold-leaf, and various varnishes, Mr. Whistler, without taking down or cutting away any thing, without altering one jot of the construction, has happily managed to obliterate some and modify many objectionable features. First, the leather, the vertical joints of which alone give evidence of its existence, he has covered with blue paint (in oil); second, *all* the woodwork except the shelf surfaces he has gilded; and third, the ceiling has been broadened and flattened by his color arrangement. Now, as over the fireplace is a full-length life-size portrait of a lady in a Japanese dress, the only broad surfaces left for painting were those formed by the window-shutter when closed, and the upper wall space opposite the fire. These spaces are occupied by decorative drawings of conventional peacocks in action, and rather larger than the life. The rest of the room is covered by patterns derived from the feathers.

"As I heard a distinguished critic remark, there is simply nothing in all ancient or modern art to equal the cunning, the craft, in the painting of what appears at first sight to be a simple diapered pattern.

"Turning now to Mr. Whistler's treatment of the decoration, we find the fussy ceiling broadened by enclosing the stars in circles within which the feather or scale pattern to which I have referred above is ranged in irregular or broken rings, the spandrels or spaces between the meeting points of the circles being filled with a feather pattern much darker in effect. The artist says that the first is a 'pattern invented from the eye of the peacock,' that the other is 'devised from the breast feathers.' Now, the first pattern is really neither more nor less than the scale or feather pattern, drawn on gold in blue lines, with a blue touch in the middle of it. Applied to the filling-in of a circle it contributes not a little to the peacock effect of the room. The breast or throat feathers between the circles form an admirable contrast, and here and there, in spite of gas-lamps, a bit of lovely blue upon blue can be made out when the light is shaded from the eyes. These two patterns occur, counter-changed as to color, from cornice to floor, and the breast pattern is particularly lovely in the lower panels of the dado where the iridescence is best seen. Now Mr. Whistler tells us that this first pattern was invented from the eye of the peacock; but had he not said so, there might have been some hesitation in supposing that he had done any thing further than accept the world-wide pattern on the serving-room door already referred to. On the shutters of the central window are two peacocks in the air, one a little above the other, with tails sweeping down to the bottom of the panel. In the other windows are single birds standing on the ground with tails lifted high into the air, the bird covering the entire height. The central feature of the whole scheme of decoration is as it ought to be in the large wall surface over the sideboard, and here it is less a fight between the gold peacocks, as described in some journals, than a defiance. The scene is wonderfully dramatic, so dramatic in fact as to make one fancy that a story might well be wrapped up in it. There is a haughty tremulous rage in one bird, the very feathers seeming to shake, a seeming secured partly by a shower of gold dots, and partly by force of drawing in the raised and recurved tail, and in the erectile feathers of the throat. In the other bird, the one of the emerald eye, whose back is towards us, and whose tail, depressed, sweeps over the top of the sideboard, one sees an outward calm, but a suppressed strength in the partly raised wing, the firmly planted foot, and the nervous tension of every feather of him, which would make us tremble for the life of the raging cock if once roused to retaliate. There is, indeed, more of Aristophanes, more of the Greek satirist, here than of Japanese drawings on fans, or trays, or crapes. The birds are, in fact, human peacocks after all, not those of the ornithologist nor the peacocks of the Zoo., and as such give an interest to the work outside the drawing, the composition, and the color. It is, in fact, the answer to the objection I have heard raised, that the bird was not a high form to take for such costly decoration, and that the human figure, and that alone, should have been used when the value of the painted decorations for one small room is to be estimated by thousands. This would have been a sound objection had Mr. Whistler been more careful in his ornithological studies; but he has drawn us something less and also more than a peacock. The drawing, the composition, and the management of the different-toned golds in these birds are as finished and as perfect as need be. To me the one defect is in the framed easel-picture over the fireplace. Its color looks somewhat sad, not to say dirty, by the side of all the gold and blue, and is an interruption to the scheme that I, for one, do not much care for. I look for more wall-space and more peacocks; and I fear the tendency of this want will be that the quarrelling peacocks will gradually be regarded too much as a picture instead of as part of a scheme of mural decoration."

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THE BUILDING OF A FRENCH LIGHT-HOUSE.

IN the north-west corner of France, in the Department of Finistère, may be found the island of Sein, a few miles from the coast, and about half-way between Brest and Lorient. This island is prolonged seawards about eight miles, by a long line of descending reef, the greater portion of which is always under water. Projecting thus into the sea, with no land between the end of the reef and the far-away shores of America, it may readily be imagined that the terrible swell of the stormy Atlantic is constantly beating against these lonely, half-drowned crags. A more unpromising site for a building could scarcely be imagined; and yet it was decided that the needs of commerce demanded a light-house on these far-reaching rocks, because they had attained an unhappy prominence as the scene of terrible losses of life and property, and because the prevalence of fogs made it impossible to give mariners sufficient warning from the distant island.

A commissioner examined the reef, and it was finally decided to select a rock known by the fishermen as Armen, although when the selection was made, none of the engineers or sailors of the light-house service had succeeded in even effecting a landing. In the lowest tides the rock was about five feet out of water, and was about forty feet by twenty-five wide. The work appeared so difficult that the engineers who recommended it said, "It is a work excessively difficult, and almost impossible; but it seems that the supreme importance of lighting the reef forces us to try the impossible."

It was decided to begin operations by covering the rock with holes a foot deep, and about a yard apart. These holes were to be subsequently filled with bars of iron extending upwards into the masonry, thus connecting it with the rock, and consolidating the latter, of whose strength there was serious doubt. As it was only at rare intervals that it was possible to get on the rock, a contract was made with the fishermen of Sein, whose daily occupation would enable them to seize every favorable moment, to bore these holes whenever they could get an opportunity.

The fishermen commenced work in 1867. Whenever there was any chance of landing, the fishing-boats hastened to the rock, and two men from each boat, with tools and life-belts, jumped on the rock, and while holding on with one hand plied the hammer or the jumper with the other. They worked with feverish activity, and every few minutes were saturated with water from the waves that broke over their heads. If a man was washed away, his life-belt supported him until he could be picked up by the boats. At the end of the year there had been but seven landings, only eight hours of work had been done, and but fifteen holes had been sunk on the highest part of the rock. It was the first step toward success. During the next year the difficulties were greater, as the work was to be done on the lower parts of the rock; but the price was increased, and experience enabled them to work to better advantage. The result of the year's work was sixteen landings, eighteen hours of work, and forty additional holes in the rock, beside some slight levellings.

The actual work of construction began in 1869. Bolts of wrought iron were inserted in the holes, and masonry with small stones and quick cement was begun. An experienced sailor lay on the rock with his back against one of the bolts and his face to the wind, and gave warning to the workmen of the state of the sea. When he announced the coming of a heavy wave they hastened to secure themselves, and they pushed their work to the utmost when he predicted a lull. All persons on the rock were provided with life-preservers, and grass-cloth shoes to prevent slipping. Whenever there was a chance of landing, a little steamboat started for the island, towing the small boats which alone could reach the rock. All stone was landed by hand, and also the cement, which was done up in small bags. At the close of the year twenty-five cubic yards of masonry had been laid, all of which was found intact when work was resumed the next year.

In 1870 there were eight landings, and twelve yards of masonry were laid. The work continued in this way until the close of 1875, at which date the total amount of masonry in the light-house was 455 cubic yards, and the structure was eight feet above the highest tides. The success of the work therefore appeared certain.

The finished tower will have a flashing light of the second order at a height of 92 feet above high tide. If the rock had been larger a first order light would have been built. The tower will be solid up to ten feet above high tide, and above that it will have eight stories or rooms for keepers, stores, and fog-bell. The total cost of the work up to the close of 1875 was $70,000.

An excellent model and drawing of this light-house was on exhibition in the French Building at the Philadelphia Exposition; but in view of the vast number of interesting things to be seen there, it may not be out of place to give our readers the above details of this difficult and interesting work. — *Cincinnati Gazette.*

NOTES AND CLIPPINGS.

TEMPORA MUTANTUR. — After the war the building known as the Old Capitol Prison, in which disloyal persons were imprisoned, was remodelled into three dwelling-houses, one of which is to be occupied by Secretary Evarts.

A FALLING ROOF. The lower portion of the roof of the mammoth freight depot of the Illinois Central Railroad in Galena, Ill., fell at five o'clock on the afternoon of March 16, under the heavy weight of snow that had accumulated during the storm. Not long before the accident the assistant superintendent and the station-agent were directly under the weak portion, examining the structure with a view to strengthening it.

THE NEW YORK COURT-HOUSE AND THE KELLUM SUIT. — Mrs. Hannah Kellum, the widow of the architect of the Court-House, has appealed from the decision against her in her suit against the city for the commission of her husband on the cost of the building. She claims that the supervisors having ratified and accepted her husband's work, the fact that the edifice might have been built more cheaply of other materials should not deprive him of his stipulated pay. Mr. Parsons, her counsel, in opening the argument jokingly said it seemed as if the Court-House Commissioners had deliberately planned the present ruinous condition of the rotunda to prejudice his case.

CONTRACT AWARDED. — The contract for the iron-work on the United States Custom-House at Cincinnati was awarded to Messrs. Snead & Co. of Louisville, Ky., they being the lowest bidders. In the list of bids which we append will be noticed the unaccountable discrepancies that usually exist. In this case the lowest bid is nearly a third smaller than the highest. A thing of which the explanation is to seek is that the two Cincinnati bidders were the highest and third from the highest bidders.

Snead & Co., Louisville, Ky.	$45,270 82
F. W. Merz & Co., Louisville, Ky.	46,131 24
Philadelphia Architectural Iron Company, Philadelphia	46,405 59
Passaic Rolling Mill Co., Paterson, N.J	46,947 77
Samuel Creswell, jun., Philadelphia	48,141 20
Joseph Hall & Co., Richmond, Va.	48,540 18
Bartlett, Robbins & Co., Baltimore	48,835 00
Union Foundry Works, Chicago	49,876 05
Arthur G. Moore, Cincinnati	51,776 44
Stewart & Stevens, Philadelphia	54,403 88
Heuvelman, Haven, & Co., New York	57,343 93
C. S. Rankin & Co., Cincinnati	63,000 00

THE CONDITION OF A NEW YORK JAIL. — The report of Mr. William A. Mundell, the architect employed by the New York Supervisors, states that the proposed plan of rebuilding Raymond-street Jail is almost impracticable: even if carried out, it would give the city an entirely inadequate jail at a cost of $100,000. A new jail could probably be built at a cost not exceeding $275,000, if it could only be kept out of the clutches of ward-politicians and ring-makers. The architect calls attention to the fact that in the present jail the corridors and cells are shut off by iron doors from the main building; the ceilings and floors are of wood, and the lower tiers of cells heated by stoves placed in the corridors. In case of fire he thinks all the prisoners would perish in the smoke.

NIAGARA SUSPENSION BRIDGE. — An examination of the Niagara Suspension Bridge has revealed some of the weak points. The cables at each end of the bridge, before they are anchored in the pit, are divided into seven strands, each strand numbering 520 wires, and terminating in a "collar" which is fastened to the anchor-bar. On examining those strands, it was found that nine of the wires on the under side of the "collar" had corroded and parted. These, it is said, can easily be replaced by splicing. One piece of the corroded wire, about three feet in length, has been removed; and it was found capable of sustaining 1,350 pounds, and drew down to half its size before parting. The wires on the bridge have as yet shown no tendency to elongation, and when a weight is removed from the bridge, return to their normal condition with the natural spring. The trouble seems to be with the anchors, which did not catch solidly. The bridge was built in 1848 by Roebling of Trenton, N.J. It was the first railroad bridge built over the Niagara River, and has a span of 821 feet. Wire cables sustain the bridge with stiffening of timber trussing, and between the abutments are 600 tons of wood and 400 tons of iron. The passage of an ordinary train estimated to weigh 80 tons caused a deflection of .41 foot, of which it is estimated that .182 foot was due to the elongation of the cables. There are two floors, one 19 feet above the other, leaving a clear space of 15 feet between them. The lower one is used for vehicles and foot passengers, and the upper one carries the track. The upper flooring is 245 feet over the surface of the water. Two cables support each roadway, four in all, and all are connected, so that the strain is distributed. The cables are 10¼ inches in diameter, and are composed of seven strands of 520 wires each, every wire calculated to bear a weight of 1,648 pounds, or 12,000 tons in all. The upper cables are brought by means of braces, to within thirteen feet of each other at the centre, and the suspenders incline inward, to give a broader base to the structure, and insure stability. A separate tower supports each pair of cables. The upper and lower floors are connected by wooden posts in pairs five feet apart, with one-inch diagonal truss rods of wrought iron passing from the top of one pair to the bottom of the fourth, over a space of twenty feet on each side, secured by screw-nuts to allow for shrinkage. Diagonal wire stays extend from the top of each tower to prevent vertical oscillation, and smaller stays attached to the under side are anchored to the rocks below. The new bridge nearer to the falls was completed in 1869. It has a span of 1,250 feet, and is sustained by two cables about nine inches thick.

NEW YORK PLASTERERS AND HIGHER WAGES. — The New York plasterers have been receiving from $1 to $2.25 a day; and at a meeting on the 13th inst. it was decided to demand $2.50 a day, and to strike if the demand was refused. It is said that at present there were about 400 plasterers in the city, while only a few years ago over 1,500 were employed. Of the 400 about 225 are in the movement. The strike of the Brooklyn plasterers, which began a few days before, has been generally successful.

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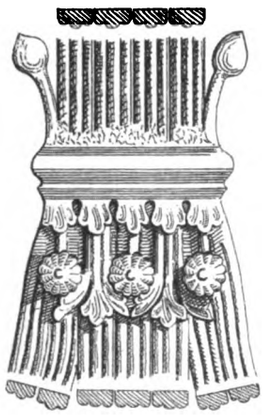
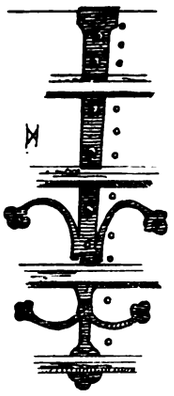
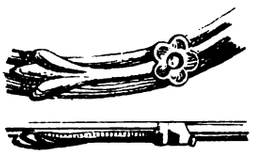
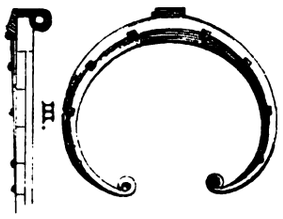
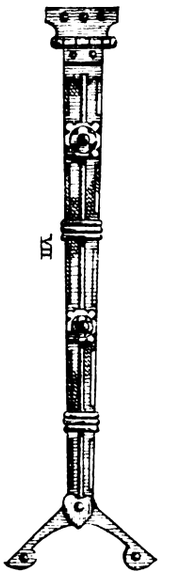
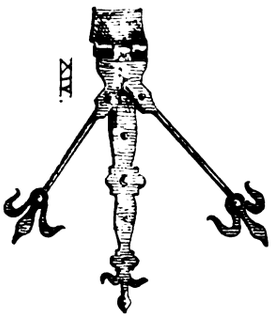
EXAMPLES OF MEDIÆVAL WROUGHT IRON WORK.

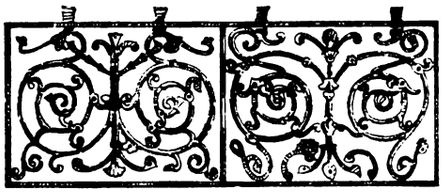



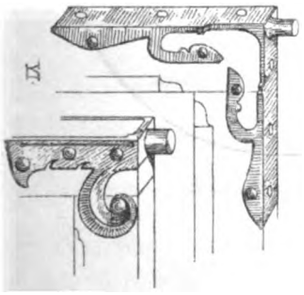


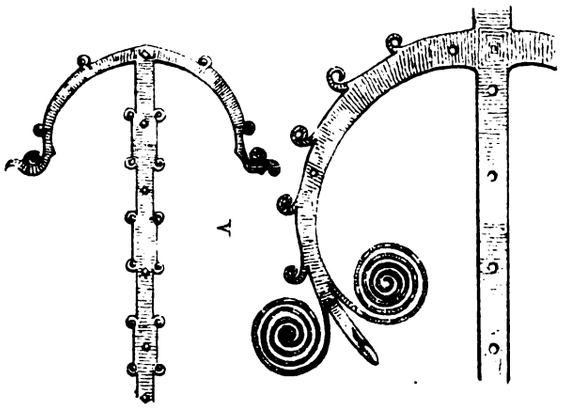


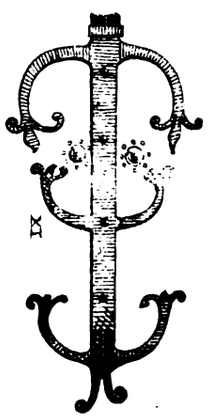


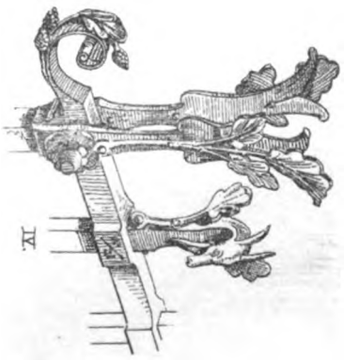












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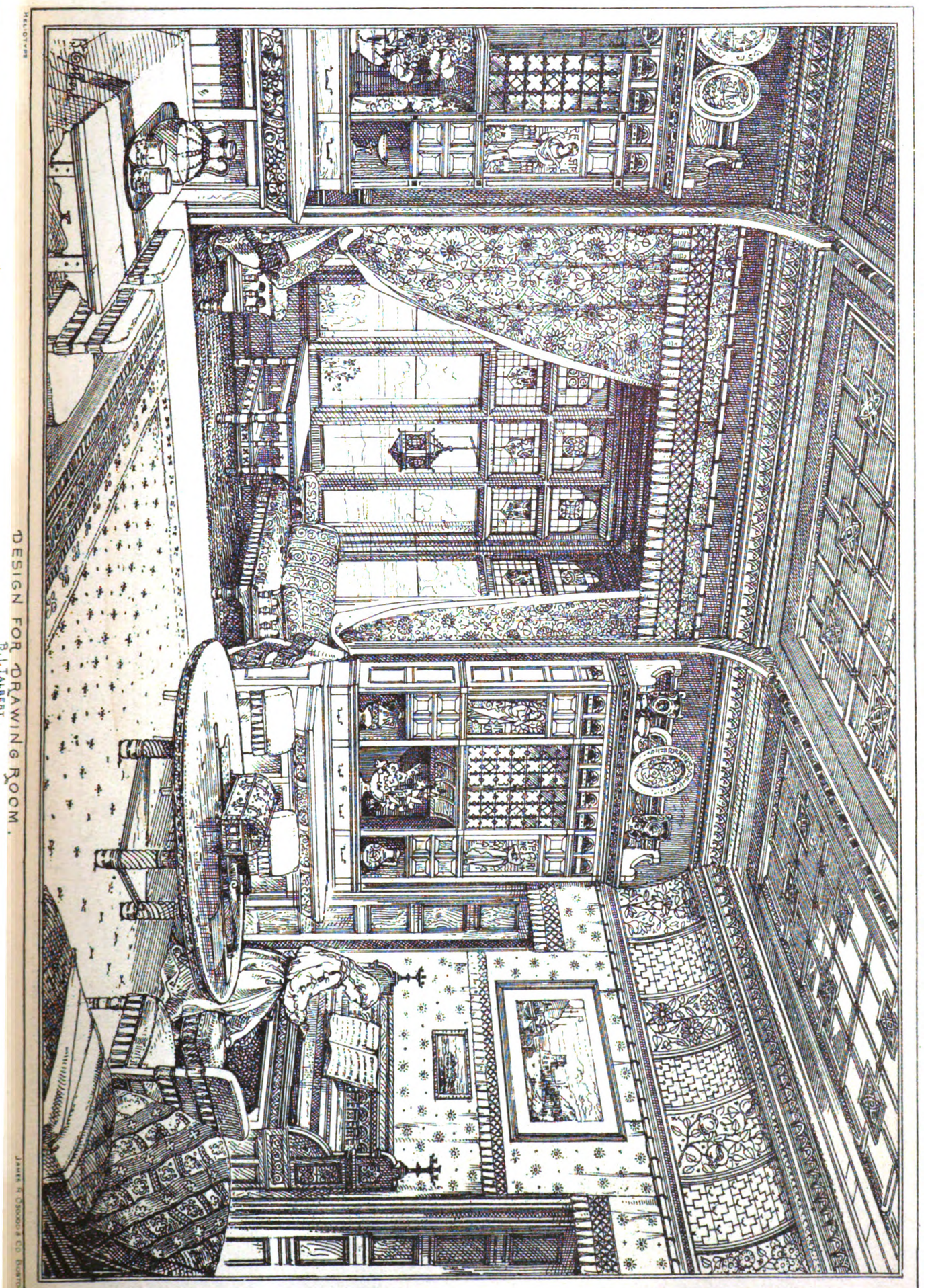

DESIGN FOR DRAWING ROOM.

B. J. TALBERT.

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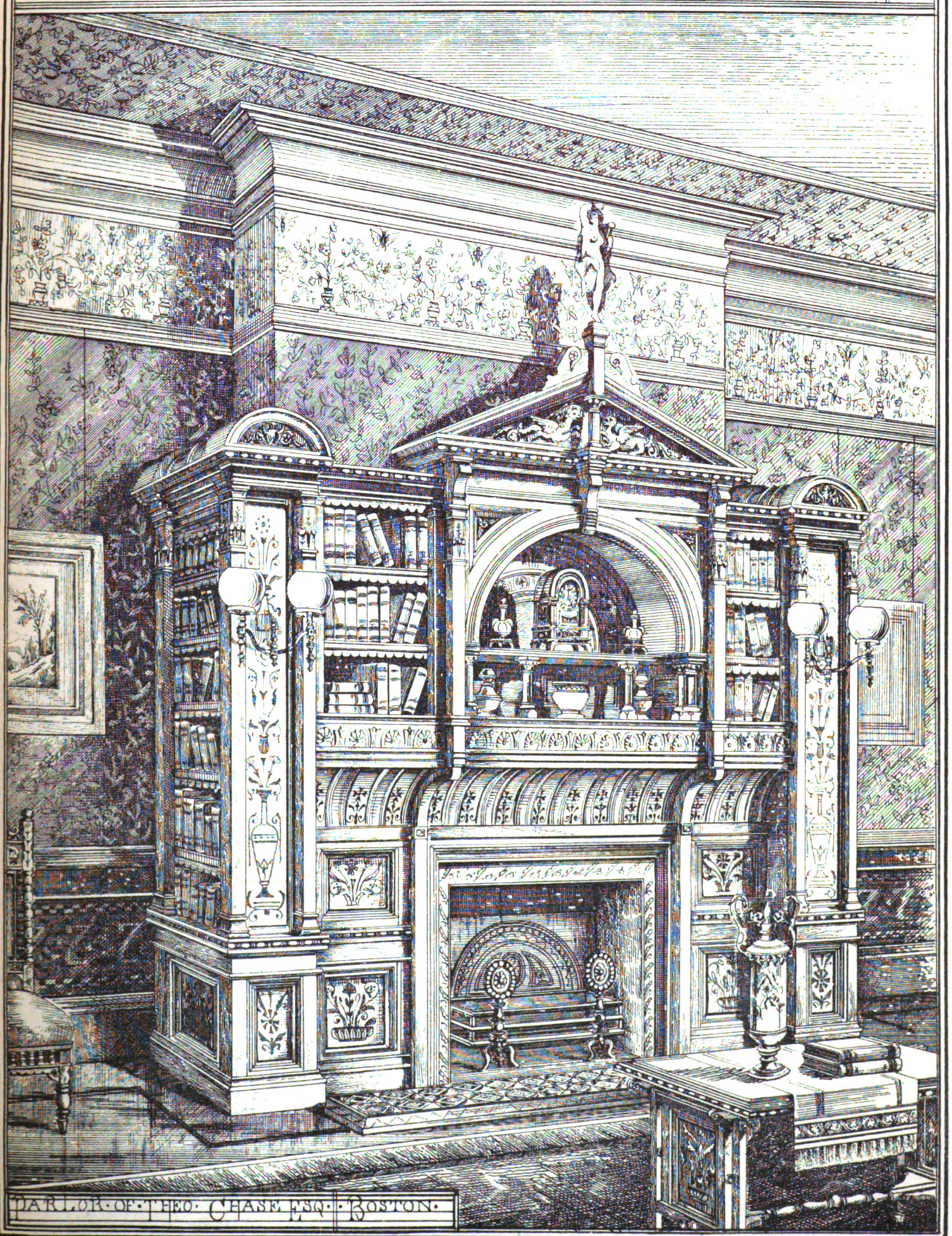
STUDIES · OF · INTERIOR · DECORATION · PLATE · III ·



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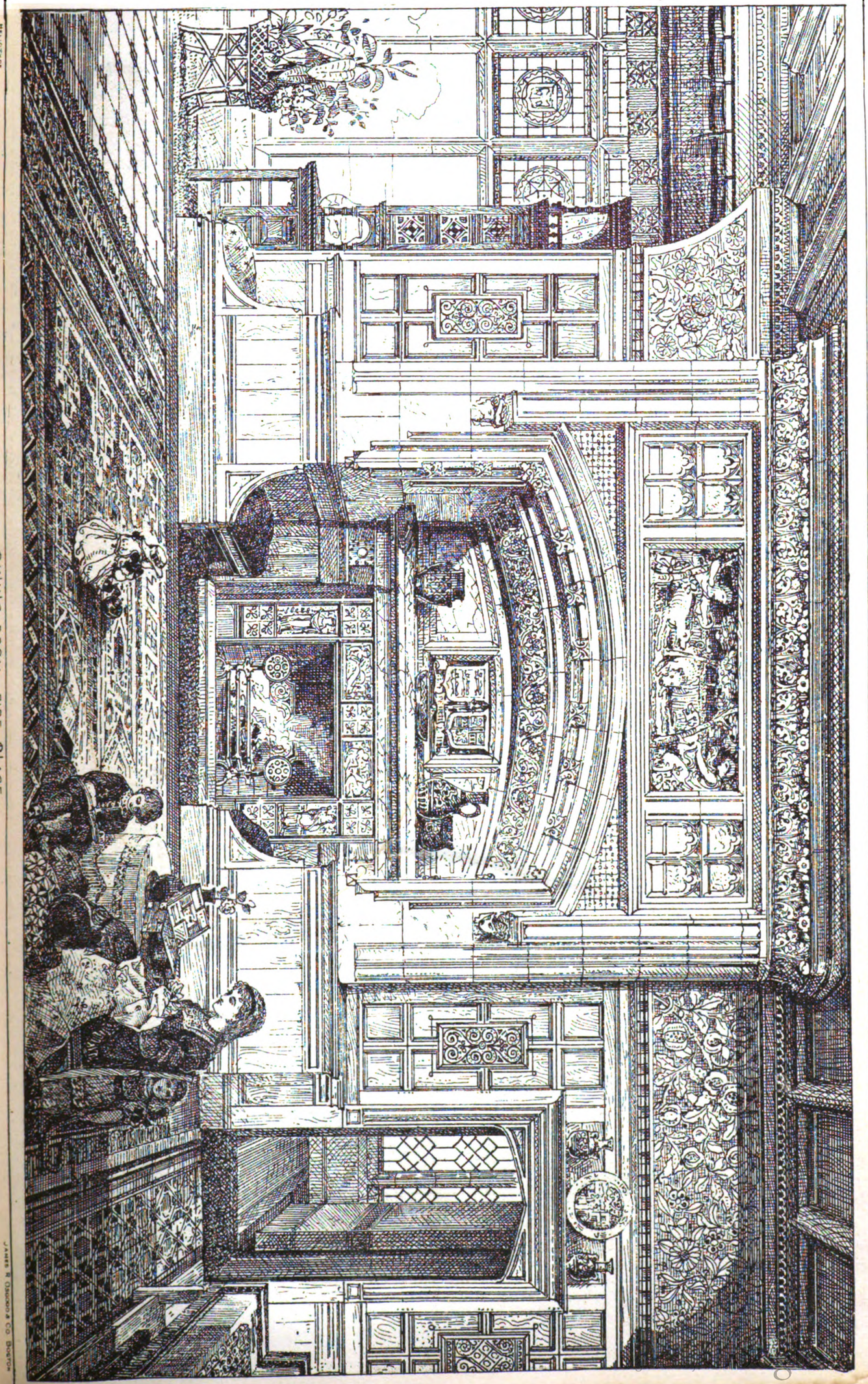

DINING ROOM FIRE PLACE.

J. T. TALBERT

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, MARCH 31, 1877.

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AN editorial in the *Nation* of last week on the Brotherhood of Locomotive Engineers suggested, as the means of meeting the dangerous power which that trades-union has acquired, and the injury which it can inflict on the public by means of strikes, the formation of another brotherhood or union among the engineers under the auspices of the railroad corporations themselves, which by assuming the charitable functions for which the brotherhood was formed — the assistance of the disabled and the relief of the destitute families of those who die — should detach the engineers from their dependence on their present union, and so cut away the foundation of its powers. We see in the last-received number of the *Architect* a letter from a prominent firm of stone-workers in London, Messrs. Schofield and Co., which proposes a similar expedient. The firm employs about fifty masons, who in consequence of the firm's refusal to discharge a non-unionist, "one of their oldest and best hands," struck without warning. A foreman sent to the headquarters of the Masons' Union, to see if the strikers would be sustained, brought back the answer that the Union had no jurisdiction in the case. Hearing that the Union men are planning a general strike for higher wages and shorter time, Messrs. Schofield and Co. propose to address a circular to the building-trade, concerning the formation of an independent builders' union which shall release the workmen from the coercion of the present unions by supplying their place.

WE should be very glad to see such experiments as these tried; but we foresee great difficulties in the way of their success. It will take, we fear, a considerable and continued pressure to bring employers up to the point where they will make such unions effective, for they have less feeling of common interest and less *esprit de corps* than the workmen. And when the thing is done there is serious question whether these unions could be made popular with the workmen, who would have a natural preference for the unions which their own class established and controlled. Besides this, whatever the purpose for which the unions were first established, that for which they continue to exist and which apparently gives them their present popularity, is the very enforcement of strikes, and support in the conflicts with employers, which it would be the object of the new unions to do away with. It is possible that if the new unions were actually supported by the masters, by adding to the wages of the workmen the tax which would be necessary to sustain them, this bounty might be accepted as a compensation for the disabilities it was meant to work. But the pressure of class feeling has become so strong among workmen in these days that its influence is not unlikely to be stronger than any other. On the other hand a real care shown in the maintenance of a union by masters might tend to substitute a common interest for a class feeling, and any thing which works in that way may be welcomed. The root of the whole difficulty lies in the antagonism that has grown up between masters and workmen. So long as this continues, the question is simply one of comparative strength; and success will probably vibrate between one and the other side, unless the whole community interposes. The hope of better things is in extinguishment of the antagonism.

A CORRESPONDENT writes from Bridgeport, Conn., the story of an experience for which we are afraid a good many of our readers can recollect a parallel. A client came to him a while ago for plans of a house which was to cost about six thousand dollars. Two different designs were sketched, and one of them was accepted by the client; but at this point another architect got his ear, and offered to render an architect's whole service for a commission of two per cent. The client returned to ask the fee expected by his first architect, who reminded him that he had in the beginning given him a card on which was printed the usual schedule of fees recommended by the American Institute of Architects. Of this the client was aware; but he chose to disregard it and demand a lower rate, offering however, in consideration of his liking for the design furnished him, to pay fifty dollars more than the fee demanded by the other architect. Our correspondent refused to agree to this; and at last the client consented to the regular commission, in case preliminary estimates should show that the house would cost no more than another which he mentioned. Several such estimates were got, and their average came within the required limit; but meanwhile, the architect having occasion to leave town for a day, his astute competitor again got his client's ear. He returned to find that the client had carried his sketches to the competitor to work out. On being taxed with this, the client claimed a right to do so, and when the architect demanded the usual commission for his sketches (one per cent on five thousand dollars) accused him of trying to extort money, and refused to pay. He at last offered to pay twenty-five dollars for the sketches, or to leave the matter to the decision of any carpenter. Both these propositions the architect naturally rejected, proposing to refer the question to any three good architects in New York. The counter proposition was refused, and the matter rested there.

THE case is a fair example of one of the trials that beset architects until they have won a recognized position. The received rates of fees are no more than a decent compensation for an architect's work when it is done thoroughly; and it is in the long run to the detriment both of the individual and of the profession, to abate them. But it is hard for a young practitioner to find himself called to fight the battle of the profession against his unscrupulous fellows, and oppressive or perhaps dishonorable clients. With a client who is dishonest enough to steal sketches from one architect and carry them to another, there is probably no remedy but a legal one; it is impossible by any system to prevent such men from getting advantages over others. But if people commonly understood the difference between good service and bad service, and the amount of labor which good service implies, the way of architects, both young and old, would be smoothed. The fact that the fees are paid at intervals in large amounts, for work that is done piecemeal and in ways that the client cannot estimate, inevitably makes them look large to him; and the fact that the smaller fees of the cheap architect are requited with slighted work, or eked out with a tax upon contractors and mechanics, is one which he does not realize. Our correspondent asserts that his undercutting rival supplements his client's commissions with those of his contractors; and it is not unlikely that he is right, for the two kinds of malpractice commonly go together. When the public realizes that this is one of the differences between cheap practitioners and regular ones, and when it has learned something of the amount of work which is rendered for his fees by a faithful architect, there will be less quarrelling over commissions. Meanwhile there will be exigencies which will constrain an architect under pressure of need to work for fees below the established rates, even though he knows it to be disadvantageous in the end. To sacrifice his present need to the general good in every such case is more than the profession has a right to exact from him. But we do not believe it is any advantage to an architect to be known as a cheap worker; and we are sure it is an injury to be known

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as one who may be beaten down from the charge he asserts. The young architect may remember too, that there are good and bad clients as well as good and bad architects. It is worth his while to put himself in the way, as far as he can, of serving the first rather than the second, not being deluded by the notion that one man's money is as good as another's.

THOSE of our cities which have been purified by fire within the last few years have been greatly improved to the eye in the rebuilding; but the gain in splendor has not always been borne out by excellence of construction, and a good deal of hasty work has been covered by showy façades. Chicago has been a great sufferer in this respect, if report may be trusted. A recent examination of a good many private houses, under authority of the Health Commissioners of that city, told a disheartening story. Of seventy-five houses that were examined, forty-one were found to be permeated with sewer-gas because of defective plumbing or drainage. Several of the houses are reported as "unfit for human habitation." Perhaps this might be said of any house in which all the rooms were found to be tainted with sewer-gas, as was said to be the case in the forty-one houses mentioned. At least it would be no stretching of language to say it of twenty-eight that were found, in which sink-pipes were carried directly into the drains "without trap or obstruction of any kind to the direct return of a stream of gas from the sewer." Among specially bad cases are cited one where a leak in a soil-pipe let out a current of air strong enough to blow out a candle; one where the settling of the house had broken or disconnected the drains, and let the sewage out under the concrete floor, — a not uncommon occurrence, by the way; one where a waste-pipe had been carried down through the cellar-floor, and left to discharge itself there. In this last case the whole area under the house was saturated with foulness. One person had recently died in it from typhoid fever, and another was dangerously ill. It would be satisfactory to know that a criminal process could be made effective against the offender in a case like this. We do not learn whether or no the seventy-five houses examined were chosen on account of special reasons for suspecting them, but it may be assumed that they were. If they were taken at random the indication would be appalling.

THE *Société Centrale des Architectes* has issued its annual invitation for a congress of French architects, to be held during the week from the 11th to the 16th of June next, and has published its programme of proceedings. The subjects to be discussed are architectural societies; the organization of the *personnel* in building-operations; the law of condemnation of land and buildings for public uses; terra-cotta as a building-material; architects' commissions; commemorative monuments still existing in France; and the architectural exhibition at the *Salon* of this summer, which will be open at the time of the congress. The proceedings will occupy the whole week, and will include visits to the buildings and grounds for the coming exhibition, to the old *Hôtels du Marais* near the Bastille, and to the *Hôtel* and *Musée des Archives*. One day is set apart for a trip to Amiens, and the examination of its cathedral and other antiquities. M. Eugène Millet will deliver a eulogy on the late Henri Labrouste, and M. Desjardins a lecture on Egyptian art with reference to the late discoveries of M. Mariette, which will be illustrated by a visit to the Egyptian Museum in the Louvre. The society offers prizes to the *École des Beaux-Arts*, the National Drawing School, and the Masons' and Stone-Cutters' Union. The session will close with a dinner and a musical entertainment.

REGULATIONS for the admission of articles to the fine-art department of the Exhibition of 1878 have been issued. The exhibits are divided among seven classes, — 1, paintings; 2, drawings, water-colors, pastels, miniatures, enamels, porcelains, designs for stained glass, excepting purely ornamental subjects; 3, sculpture; 4, medals and lapidary's work; 5, architecture; 6, engravings; 7, lithography. Copies of all kinds are excluded, as are unframed pictures or drawings, and sculpture in unburnt clay. French artists are to register their works executed since the exhibition of 1867, a year beforehand (in May, 1877), and from their registration will be prepared a list of works which are by privilege exempt from examination by the jury; these need not be presented till just before the opening. All other works must be submitted for the examination of the jury in January, 1878. The admission of the objects offered is determined by the vote of a majority of the jury, but in case of a tie-vote the object in question will be admitted. Already between twenty-one and twenty-two thousand applications for space in the Exhibition have been received from French exhibiters, although some of the departments have not been heard from, so that the number is not likely to fall short of the twenty-five thousand that has been estimated.

A LETTER to the New York *World* describes a tablet which has lately been discovered in Stoddard County, Mo., and which is in some respects more curious than the stone tablets found in Tennessee, Illinois, and Iowa, which we have lately described. Like these it was exhumed from a mound, is of portable size, ten and a half by thirteen inches, and is covered with inscriptions. But this tablet is of terra-cotta and glazed; both sides of it are inscribed with cleanly cut characters arranged in lines, evidently incised before glazing and while the clay was yet soft. The writer in the *World* sees in the characters a resemblance to those of the Sanscrit alphabet. The tablet has been sent for examination, it is said, to Harvard College.

THE INDIANA CAPITOL BILL.

THE project for the new Indiana State Capitol, to which we alluded in our last number, is the most important that has been before the architects of the country for some time, and in the present great stagnation of architectural work ought to be a matter of considerable interest to the profession. We will recall the main provisions of the act, which we described a week ago. It establishes a commission of four members, in whom, with the governor as the fifth, the whole authority for building the new State House is to be vested. They are to give security in the sum of twenty thousand dollars each for the proper performance of their duties, and that the cost of the building shall not exceed the two million dollars appropriated to it. They are to call in an architect, an engineer, and a builder as experts to advise them in selecting a plan, and they may adopt one of those that have already been submitted; but if they are not satisfied with any of these they are to call a competition, for which ninety days are allowed; and if this does not suit them, another, and so on till they get what they want. When they are satisfied, they are to adopt a plan, appoint an architect who "shall be the superintending architect of the building," and if they will a superintendent also; they are to award and record contracts for all parts of the work, no contracts for a larger amount than five hundred dollars being lawful except when passed upon by the Board in session; they are, in the language of the act, to "build a new State House," and for this purpose absolute controlling power is apparently vested in them alone, including not only the choice of designs and architect, contractors and superintendent, but the supervision and approval of the estimates and the limiting of the cost.

Every architect who enters into the competition is required to bid for the commission with a sealed proposal saying for what fees he will undertake the work. Before one is engaged for it, he is required to furnish plans, specifications, and estimates whose completeness and accuracy he can absolutely guarantee; and he must find surety in the sum of one hundred thousand dollars that his plan shall be "complete and perfect," and that it shall be "completed and finished in every part" for the sum at which he estimates it; if there is any extra work required on the building beyond that for which he provided in his first estimates, he must pay for it out of his own pocket. His commission may be determined by the commissioners, in view of the bids of the competitors, but it is not to be greater than three per cent. If any member of the Board, or the architect or superintendent, has any pecuniary interest direct or indirect in any contract for the work, or derives any profit from it except his regularly appointed fee, he is declared guilty of felony, and subject to a fine of ten thousand dollars, and two years' imprisonment.

There are some points in the act that deserve commenda-

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tion. The association of experts with the commissioners in choosing a design is a timely recognition of the fact that such a choice requires the knowledge of an expert, though it is difficult to see what advantages are to be gained from calling in a builder, which are not already secured when both an architect and an engineer are provided. With the duplex politics of the commission we have no concern, but we do not see what these have to do with their fitness for their duty. It is well to have it clearly understood from the beginning what the architect's commission should be; and the limit which the bill fixes, three per cent, does not vary greatly from the customary fee for works of so great cost, which is five per cent on the first half million, and three per cent on the remainder, the difference being two per cent on a half-million, or ten thousand dollars. The extreme fee allowed, which would be sixty thousand dollars, looks large stated in the lump; but it is to be remembered that the work would last at least five years, and that during that time it ought to have the whole attention of an architect of the first rank. This gives twelve thousand a year for the architect's fee; but if he does his work as thoroughly as he ought, he will have to spend as much as eight thousand a year, perhaps as much as ten, in carrying it on, for pay of draughtsmen, clerks, and superintendents, and other office expenses. This would leave him perhaps three thousand dollars, or even something more, as his salary for designing and administering a very difficult and important work, involving the expenditure of two millions of dollars; certainly not a liberal salary. There would, however, be plenty of architects, and capable ones no doubt, who would be willing in these times to undertake the work on such terms; but to go into the market to see who will offer to do the work for the lowest fees, and to make this a consideration in selecting an architect, is to open the door to one of the most demoralizing abuses that beset the profession, and is likely to give the thing a bad odor from the start; while the saving of a fraction of a fee is of no importance whatever in comparison with the excellence of the service rendered by the architect, which certainly will not be in ratio of the smallness of the commission he will accept.

The provisions of the bill imply a belief that every inducement is offered that is necessary to attract an unlimited concourse of architects; for competitions are to be repeated until a suitable plan is secured. It is expected, therefore, that in a competition which calls for plans, specifications, and estimates for a very large and costly building, minute enough to make its cost absolutely sure, re-enforcements of architects will come forward, company after company, each offering up work which has cost him some hundreds of dollars in actual outlay, and represents two or three thousand dollars worth of study and labor, so long as the commissioners are unsuited.

The rigorous provisions which the bill proposes for restraining the cost of the building within a definite limit are no doubt stimulated by the unlucky experience of the neighboring State of Illinois, which, whether it has got its money's worth or not, has spent a good deal more upon its capitol than it intended, and has not yet finished it. A State has of course a right to insist that its capitol shall be built for any sum, sufficient or insufficient, that it chooses to fix, and to hold those who are in authority over it to as close an account as it will. We pass over the question of professional dignity, although putting a professional adviser under bonds for the quality of his advice and the perfection of his professional work is, so far as we know, a thing quite without precedent. But to bond an architect for the cost of his work, and to force him to pay the cost above a certain limit, is to make a contractor of him to all intents and purposes. The only logical course would be then to allow the architect to contract absolutely for the building; and since it is not the business of an architect to make contracts for work, this would be accomplished by the popular contrivance of making a contractor an architect. Yet here the architect who is held to assume the risk is made a felon if he derives any profit from the work. This last provision without the first is reasonable and wholesome, and we wish it or something like it could be made operative in all the length of the land. But to hold a man to all the risks of a contractor, when he cannot and should not receive any of the compensations, is rather hard measure.

We are not of those who think that an architect has an uncontrolled right in the expenditure of his client's money. We have always argued that he ought to be held to a strict accountability for his work, and made pecuniarily responsible for faults in it that are due to his neglect or incompetence. It is commonly understood that this liability extends to the amount of his commission, and to this extent it is in the power of the client to enforce it. Considering that the loss of his fee means not only the sacrifice of the small proportion of it which would ultimately find its way into his pocket, but of the much larger share which he must pay out in the expenses of the work, the liability to it, which might reasonably be affirmed in this act, would be enough to secure as great caution and care in the execution of his trust as one could hope to enforce under any but a bowstring government. Beyond this we do not see why the State should not look for its remedy to damages, as any other client would.

The Legislature of Indiana seems, in fact, to have altogether confused the functions of an architect with those of a contractor. To say that a certain sum of money and no more shall be allowed for a building, is one thing, and implies that the design for it shall be adjusted and readjusted, as its cost is developed by continued study, until it is brought to the right limit. To insist that a design when it is first brought forward for acceptance shall be so carried out in detail that both its cost and its completeness can be guaranteed under heavy penalties, is a very different thing. To do this in the case of so large a building requires a great amount of very careful and expensive work, and lays upon the architect what is no part of his duty. It is proper for the architect to prepare a reasonably trustworthy and approximate general estimate of the cost of his design; but to prepare an estimate exact enough to be guaranteed, is the business of the men who undertake the work. It is decidedly better also that such an estimate should be furnished by some one who is not interested in the success of the design. To require it of the architects is to require that each competitor shall carry his plans up to the working point before he submits them; that is, shall spend some months of hard labor and hundreds of dollars on the mere chance that his design may be preferred to those of all the others, — a condition which is likely to be rejected by those who would fulfil it in a capable and trustworthy manner, and evaded in some way or other by the unscrupulous. It seems obvious that in restraining the cost of a building within the limit fixed for it, as in any other duty, the responsibility should be where the authority is. In the ordinary conduct of business, the awarding of contracts, revision of estimates, and control of expenditure, is in the hands of the architect. In the case under consideration a special commission is appointed for all this, a provision which is usual and reasonable, and yet the architect is still to be held pecuniarily responsible as if the authority were his. Let us suppose that the commissioners, having adopted a plan on the basis of the appointed allowance of two millions, are pleased afterwards to order, as committees will sometimes, some modification of it which the architect undertakes, and that in the end this modification carries the cost above the limit. The commissioners, who are also under bonds each in one-fifth the amount of those that are required of the architect, may save themselves perhaps, by refusing to allow accounts beyond the limit; but meanwhile the architect finds that it is no longer possible to complete his building within his two millions: then he is held to the alternative of finishing it at his own cost, or of being mulcted for the imperfection of his plans if he does not. Or suppose that the commissioners carry forward the building during four or five years by successive contracts made in the usual way, as the work requires them, and that in the course of the work a rise in prices makes it impossible to carry it out without exceeding the appointed cost: in this case the same difficulty occurs again. It looks as if the commissioners would have the architect very much at their mercy, and might easily, if they were vexatious or inconsiderate, put him in a very tight place. A vexatious or injudicious building-committee is not an unheard-of thing any more than a dishonest or incompetent architect; and there is perhaps no adequate security against this even in making half of them Democrats and half Republicans. If there is no security where there is no responsibility, where there is responsibility there should be authority.

It remains to be seen how much competition will be called out, and of what sort, in pursuance of this rather inconsid-

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erate bill. The framers of it have acted on the belief that to get the best service, or at any rate such service as would content them, it is only necessary to give architects a chance to offer themselves on any terms. The idea that it is important to present any inducement by which the interest of the best men in the profession could be secured, has evidently never occurred to them. It may be that the commissioners, whom, by the way, the governor is not obliged to appoint earlier than the 1st of next September, will be satisfied with some one of the designs which have been already sent in, and so avoid the perplexities of further competitions. If not, they will doubtless find a good many architects in this hungry time who will be willing to accept any bone that is thrown to them; and if they do not inquire too curiously into the condition of their sureties, they may have no difficulty in exacting the necessary bonds. The commissioners may show themselves more considerate than the Legislature; they may be able to obtain some amelioration in the conditions; but these as they are now fixed, though they may invite the irresponsible and careless members of the profession, are of a kind, we should say, to deter those who are most conscientious and trustworthy.

WOMEN AS WOOD-CARVERS. — THE MOVEMENT IN CINCINNATI.

VISITORS to the Women's Pavilion at the Centennial Exhibition were generally surprised to find there, among many other surprising things, a large collection of furniture. This was in the pleasant Cincinnati corner. The question was naturally asked, "Have women turned cabinet-makers?" It could be answered in the affirmative, for several of these pieces were entirely made by women. But these were exceptional. The object of the exhibition was to show the progress made during the last few years in the art of wood-carving as practised by women. Cincinnati is the centre of this industry, and the extent to which it has been carried is surprising. The works of this kind thus far produced are those of a school as distinctive and individual in its character as those of any other school of art that has ever existed. The exhibition was made up from the contributions from two classes of artists, — those from the school of carving conducted by Henry L. Fry and his son William H. Fry, and from the McMicken school of art conducted by Mr. Pitman. Their methods are so similar, however, that it is impossible to distinguish between them from the style of the work; and in aim and motive they are practically one, moving together in perfect harmony and good fellowship.

It has been an interesting task to trace out the origin and organization of this remarkable movement. The master spirit and originator of the whole is Henry L. Fry, an English workman. We are indebted to him for much of the information received. But he has had able and enthusiastic coadjutors, and what is more remarkable, the movement has received such financial support that its permanence and future development are assured; for what has been done thus far can hardly be considered as more than trial work, — that is, so far as the education of women is concerned, — and a foundation for better things to come as opportunities offer.

Mr. Fry is a native of Bath, England. He worked on the famous Fonthill Abbey, built by William Beckford, and thus became initiated into what was then considered as the Gothic revival. He worked also on the screen of Westminster Abbey under G. G. Scott, and the House of Parliament under Charles Barry and Pugin. He left London in 1849, before the Gothic revival had taken that shape in which the present generation have watched its progress; but he has not failed to follow its developments and fortunes to the present day. He did some work on the Ohio State-House at Columbus, but has resided mostly in Cincinnati. His work in that city has been extensive, and may be found in the houses of Edmund Dexter, Judge Estes, Mr. Probasco, Mr. Shillito, and Mr. Nichols. Any one who has seen the interior of the house of Mr. Probasco, designed by Mr. Tinsley of Cincinnati, could not fail to have observed the rich carvings of the staircase, so varied that each baluster is a study by itself. Designing his own carving, and impressing upon it his own individuality, in a time when such work throughout our whole country was of a character as debased as it would seem possible to be, his work did not fail to receive just and due recognition from a few architects and appreciative amateurs. It was the work done by his son Mr. William H. Fry, in the house of Mr. Nichols, which excited such general interest in the art that many persons sought instruction from him. Mr. Nicholas Longworth, jun., was one of the first to take to it. Mr. T. S. Noble, the painter, and principal of the McMicken School of Design, became interested, and formed the project of introducing the study of wood-carving into that institution, and finally succeeded. Mr. Ben. Pitman, well known as an authority in phonography, was one of the champions. The introduction of the study of wood-carving in the School of Design in 1873 was largely due to the influence and indefatigable exertions of Mr. Pitman, who exhibited some fine specimens of his own work, and that of members of his family, to the committee having the school in charge. He volunteered to give three lessons a week to such of the members of the school as chose to take up the new study; and no less than eighty-eight members were enrolled in his class, nearly all being women. At the end of three months an exhibition of the results was given, which astonished all beholders. Recognizing the fact that a more liberal expenditure of money would greatly increase the usefulness of the school, Mr. Joseph Longworth made two gifts of fifty thousand dollars each, the interest of which should be devoted to the support and improvement of the School of Design. He said in making the gift that "some employment ought to be provided for the idle rich, as well as the industrious poor." The carving school has shared in the benefits of this contribution. A Cincinnati correspondent of the *New Century for Women*, a paper published at the Centennial Exhibition, speaking of the work done in Cincinnati says, "Much of the work thus far has been done by those who desired some special article of furniture for the decoration of their own rooms, or who wished to make a gift doubly precious to a friend by offering the work of their own hands; but there are also some who propose to make this work a profession, and who are willing to execute orders."

The class in the McMicken School of Design became so large after a while, that several ladies who were desirous of a more special instruction than could be there obtained went to Mr. Fry's workshop, and studied where they had the advantage of seeing his own and his son's work in progress. They soon requested him to form a private class, charging pupils for instruction, which he did in 1874; and now he has a regularly organized school. The work of his pupils formed a considerable part of that sent to the Centennial Exhibition.

In a private letter written in July last, and published in the Cincinnati *Gazette*, Mr. Fry speaks thus: —

"We were very fortunate in our pupils. My son gave them particular attention, and they responded by faithful and diligent application; and I know that it would be a difficult matter for us to get such excellent work from the ordinary skilled workmen who *make* ornamentation. Most of our pupils, of course, have the culture, taste, and refinement that are needed for such work; and their delicacy of manipulation and their leisure must be taken into account. Besides, the hand of woman is better adapted and admirably organized for some of our work, — better fitted for the development of the beautiful in art."

Mr. Fry not only had his class in Cincinnati, but was induced to form another in Dayton only a year ago. Here he had sixteen lady pupils, to whom he gave twenty-five lessons. Some of their work also went to the Centennial.

While writing, we have before us a photograph of a corner cabinet from the house of Nicholas Longworth, carved by William H. Fry. It is a remarkably fine specimen of the art-work of one whose example has had such a potent influence upon this new school of carving. The motive is evidently English Gothic of the fourteenth century; but it is such as a son who had never seen the old work might inherit from a father perfectly conversant with it. The carving is treated throughout with freedom from the restraint always imposed by an attempt to work in a style. The wardrobe has two doors; each door has a rail in the centre, the lower space being divided into two upright panels with elaborate *linen* panels, while the upper space contains one large carved panel. The treatment of the upper panels is somewhat after the manner of monumental brasses. The left-hand door represents Freyia, goddess of love [?] and that on the right Thor, god of strength, from the Norse mythology. The drawing of each figure is given mostly in lines and slightly indented work, while the groundwork is cut away to a greater depth. The border around each panel, which is richly carved with rosettes in circles, is again on the same level with the surface of the figure. All the moulded work on the wardrobe is carved, and the sloping top is covered with carved scales. In fact, very little plain work is visible, the framework of the doors even being carved with intaglio work. Herein is a fault which Mr. Fry's pupils have not failed to copy, and which destroys all repose in the work. It was noticeable in the women's work at the Exhibition that there was an evident disposition to cover all plain surfaces with niggling ornament, thereby detracting attention from the really fine carving with which the more important parts of the articles were wrought. This would hardly be worth mentioning here were it not for the unfortunate example of the younger Mr. Fry. But aside from this, his work has real artistic merit. The hinges and other metal-work of this piece are especially noticeable, being original in design, and skilfully wrought.

It seems but a short step from the work of Mr. Fry to that of his lady-pupils. Of the great number exhibited at Philadelphia some were well worth attentive study. The panel-carvings in relief by some of the ladies were careful studies of natural form, handled with great vigor and precision, while others attempted figure-subjects in low relief. Conventional ornamentation of mouldings and shafts in low relief was generally well handled; but the prevalent error of introducing fine incised ornament where surfaces should have been left plain, was everywhere to be seen. It was noticeable that but few attempts had been made to reproduce undercut work; but this is not surprising, considering the short experience of the practitioners. It may also be ascribed to the natural inability of women to perform the muscular part of the work. The degree in which they accomplished even this is sur-

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prising; but an explanation offered by Mr. Fry will tend to make it clear. In answer to an inquiry as to how women could drive the carving-tool by blows from the flat hand, as is common with all carvers, he said that they used wooden mallets very extensively, and became remarkably expert with them.

Among the examples of work by pupils of the Frys, we noticed especially the carved panels in a corner cupboard by the wife of Judge Force of Cincinnati, which were of birds and flowers carved in relief, and nearly covering the two large panels.

The bedstead designed by Mr. Fry, and carved by Mrs. Dr. Williams of Cincinnati, was a fine piece of furniture both in its design and decoration, and decidedly the best designed of any in the women's exhibit. The headboard had an appropriate inscription in the German language, "*Morgenstunde hat Gold im Munde*," of which the translation was given, "The morning hour hath gold in its mouth." All the raised panels were treated with figure-subjects of personal interest to the owner of the article.

There were also an elaborate Gothic table by Mrs. W. Dodd of Cincinnati, with a finely wrought vine on the flat smooth top, treated in the Japanese manner; and a carved easel by the same lady.

One of the finest exhibits was a hanging cabinet by Miss Louise McLaughlin of Cincinnati, entirely of her own design, all the carving and decoration being wrought by her own hands. The cabinet was designed in the style of B. J. Talbert. In the doors were hand-painted tiles, with gold ground, representing ladies in the costumes of 1776 and 1876. The hinges, modelled by Miss McLaughlin in wax, were cast in bronze and finely chased. This piece was filled with paintings on porcelain and pottery by the same artist.

Coming to the work of Mr. Pitman's school, we found many examples of his daughter's work. On a chest of drawers was represented a summer poem in six verses. Here were for April a crocus and snowdrop, for May ferns unrolling their leaves, for June honeysuckle and jasmine, for July convolvulus and balloon vine, for August poppy, and for September gladiolus. The handles and escutcheons of these drawers were modelled by Miss Pitman, cast in brass and nickel plated.

There were also two oak doors from Mr. Pitman's own house, carved and inlaid with ebony by his daughter.

The Misses Johnson exhibited several pieces, among them a bedstead carved to commemorate the vines growing on the porch of their own house, a bit of appropriate sentiment in view of the fact that the vines proved to be excellent motives for decoration. The work was done in black walnut and ebony, and a panel was introduced with painted decoration on a slab of slate. The inside of the footboard had the most beautiful and delicate piece of carving we have ever seen, representing a convolvulus in intaglio. The last-mentioned ladies have adopted carving as a profession.

Besides the above were good examples by Miss F. M. Banks of Cincinnati and Miss M. L. Pack. A cabinet organ carved by Miss Banks was inscribed with these words from Moore, —

> "She sang of love, as flowers would sing
> If love could lend their leaves a tongue."

Besides furniture there were brackets and shelves in profusion; but among the most useful applications of women's work were noticed a number of alms-basins and book-covers, and especially a prayer-book by Miss Helen Collard.

It seems invidious to criticise these works, in view of the fact that none of them are the results of more than three years of study and practice, and it is not yet time to see what will be the practical results of the movement. So far as the amateurs are concerned, it may prove to be only a temporary burst of enthusiasm, like that which follows every novelty. But though refined ladies may get tired of the self-imposed drudgery necessarily connected with much of the work, the knowledge gained by them of an art which is generally so little appreciated will ever serve them, not only in their ability to judge of the works of others, but in doing good missionary work wherever they go. It is the want of just such knowledge as this that deprives good artistic work of the patronage so essential to its encouragement.

Those women who undertake it for a livelihood will doubtless go on and improve in the quality of their work; but, as has been said, the range of it will always be limited. With these two things are necessary to make the movement a permanent success. First in order is the encouragement of those who have employment to bestow and the intelligence to guide it into useful channels; for this we must look to the able architects of Cincinnati. Second, it is essential that the carvers receive that higher instruction in art-workmanship which can only be obtained from the study of the best models. It is also important that they be employed to work on things which are beautiful in themselves. The absence of any furniture of good design in the exhibition except that made by Mr. Fry and Miss McLaughlin was noticeable. The work from the McMicken school showed that the art of carving had been better cultivated in that institution than the designing of furniture. When the influence of scholarly and educated designers, in full accord with the latest developments of decorative art in England and America, is felt in the school which has had its inception in Cincinnati, we may safely look for the best results of the labors of these "idle rich," as well as "industrious poor" women of America.

THE ILLUSTRATIONS.

DESIGN FOR ST. GEORGE'S CHURCH, BALTIMORE, MD. MESSRS. WYATT AND SPERRY, ARCHITECTS.

(Cor. Charles and Lexington Streets, Baltimore, Md.)

THIS sketch was prepared for St. George's Church, Pennsylvania Avenue, Baltimore. The outside dimensions of the building are 44′ x 88′, and it will have 400 sittings. The walls are to be of Baltimore County marble laid random range, with chisel-dressed band-courses, archstones, etc. The roof and wainscoting will be of yellow pine, and the pews, communion-rail, and altar-furniture of cypress.

SPECIMENS OF CARVED FURNITURE EXHIBITED AT THE CENTENNIAL EXHIBITION BY THE LADIES OF CINCINNATI, O.

See preceding article.

COMPETITIVE DESIGN FOR THE WOBURN TOWN LIBRARY. MESSRS. PEABODY AND STEARNS, ARCHITECTS.

(60 Devonshire Street, Boston, Mass.)

FIRE-ENGINE HOUSE, FALL RIVER, MASS. MESSRS. HARTWELL AND SWASEY, ARCHITECTS.

(29 Pemberton Square, Boston, Mass.)

VENTILATION.

ONE of the first requisites of a building in which human beings are to dwell, is that it shall not only be convenient and adapted to the end, but also that it shall be comfortably warmed and thoroughly ventilated, — that the thermometer shall register a given amount of heat in the coldest weather, while at the same time there shall be a steady and uniform change of air, without draughts or perceptible currents. An Esquimau, to keep warm, closes the small entrance to his dome-shaped hut of snow, lights his smoky oil lamp, draws around him his bear-skins, and gives himself up to rest. One would suppose that he would die there: not so, for the porous nature of his building material allows a certain change of atmosphere, and although he comes out of his slumber reeking with perspiration, his vitality is not apparently injured. I say "not apparently;" but undoubtedly this mode of living, coupled with his exposed life and hardships, tends to shorten his days. Few of his race ever reach what we would call the prime of life.

A Russian, with many advantages over the Esquimau, so far from availing himself of his better dwelling to live more comfortably, labors to exclude from it the breath of heaven, to make of it a lazar-house. He has but one aim and object when the winter sets in; and that is, to keep out the cold, and keep in the heat generated by the great stove that nearly fills his quarters. Every orifice through which the external air can find admittance is closed up, the cracks around the windows are pasted over, and he depends on the opening and shutting of doors for any change of air in the building. Here he bakes and stifles; for his house, built of more substantial materials than that of his half-brothers the Esquimaux, is an effectual barrier to the outer air, and death, as a natural consequence, becomes a frequent visitor. Typhus fever, that scourge, is so common in Russia, that little notice is taken of it, and the work of death goes steadily on; for the Russian, with that strange leaning to fatality which has ever characterized his race, believes what is to be, is to be, and that no effort on his part would avail, even if he sought to bring about a change.

We are not so far behind in our sanitary reforms as the Russian, and yet our system of heating and ventilating is any thing but perfect. But defective though it may be, we are alive to our wants; and that in itself is a step in the right direction. If we have failed in the past, we have learned something of the difficulties that beset our path; and the knowledge we have gained in making our experiments is so much capital with which to make further investigations.

Atmospheric air, as we breathe it in the open fields, is composed of one volume of oxygen gas mixed with four volumes of nitrogen; and we know that whether we test it in the valley or high up on the mountain, by the sea-side or far inland, we find the proportion of the oxygen to the nitrogen the same. We may expand it or condense it, but it undergoes no change. We cannot live without it, and it must be fresh and pure, otherwise we sicken; our appetite is gone, our spirits are depressed, our vital powers are weakened, and we become an easy prey to typhus, typhoid, or some other terrible disease.

We know that atmospheric air, however pure, when it has once passed through the human lungs, becomes charged with carbonic acid gas, and is no longer capable of sustaining life. Rousseau long ago said, "The breath of man, in too great a degree, is hurtful to his like," — an axiom which has been repeated *ad infinitum;* and yet we breathe and continue to re-breathe the air poisoned by our fellows, and wonder what it is that makes us so uncomfortable.

This compound of oxygen and carbon is almost always present in the air we breathe; but the largest quantity found in the external air is but little over six volumes in ten thousand volumes;

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the quantity being largest in summer, and there will be more of it found at night than during the day. Within doors the proportion is greatly in excess of these figures. In what may be called a healthy atmosphere, the quantity will not exceed one in one thousand. Any thing above that is injurious to health, and it is not a difficult matter to carry it to a degree that will prove fatal. Aside from the waste of pure air attending the consumption of fuel and the burning of gas, every man, woman, and child helps to poison the air we breathe. Every human being exhales from three to four per cent of carbonic acid gas with every breath, and it has been computed that the average is not less than two-thirds of a cubic foot per hour for every individual.

Nor is this the only subtle foe in our dwellings and public edifices. Carbonic oxide is even more deadly than carbonic acid gas; for it has been found that one per cent of it, mixed with the air we breathe, will result in death. The proportion of carbonic acid gas should never be allowed to exceed one in five hundred of atmospheric air; but through neglect, or a want of a proper appreciation of what is due to ourselves and our little ones, we pay little heed to this, and then wonder that so many around us suffer from headache, nausea, and even low and fatal fevers, — wonder that the nidus of typhus has found a field in our dwellings, where it may germinate and sow its seeds.

With this question of ventilation there comes up the query, how much space should be allowed to each person in a room. The Poor Law Board of England has probably reduced it to a minimum, allowing five hundred cubic feet in the sick wards, and three hundred cubic feet for each healthy person. We must all admit that this is a near approach to the "one straw a day" theory. The English Barracks Commissioners have urged that the five hundred cubic feet per man allowed by the regulations should be increased to seven hundred; but Florence Nightingale, sustained by her medical advisers, maintained that the minimum should not be less than fifteen hundred feet, at least in hospitals. That this matter is receiving marked attention, we have the most encouraging evidence. A city ordinance in San Francisco forbids sleeping in a room containing less than five hundred cubic feet of air to each occupant, — an ordinance which has been enforced by arresting Chinamen who have violated it. That men do live where the average to each sleeper in a room is not over one hundred cubic feet is well known: how they live, and how they die, let the physicians who attend them in their last sickness tell.

In ventilating a room there are several points that require attention. (1.) We must secure an ample supply of fresh air. (2.) The vitiated air must be removed at once. (3.) The air in the several parts of the room must be of a uniform temperature. (4.) There must be an entire absence of draughts. How we get the fresh air, or the manner in which it is introduced, is a matter of no consequence, provided that the supply is ample, and that it be delivered without perceptible currents. As a proper test, it is stated that a lighted taper will burn without flickering in a well ventilated room.

There are two systems of ventilation resorted to; and, whilst they have each their supporters, they have both been found faulty. The advocates of the one hold that the heavier gases — the impurities that have been thrown off from our lungs — descend, and should be drawn off at a point near the floor, the fresh air being admitted from above. The advocates of the other — Dr. Arnott being of the number — maintain that "all heated and respired air rises, and therefore should find exit from the uppermost part of our rooms; the fresh, cooler air taking its place below." This latter method has generally been adopted in hospitals; but it is open to the grave objection that the currents of cold air so admitted are sensibly felt by the patients, who are keenly alive to such draughts, and who, to correct what they look upon as a bad system, tamper with the registers when an opportunity is afforded them. The theory that carbonic acid gas, being heavier than air, falls to the floor as soon as it is exaled from the lungs, is now exploded; it having been shown, not only that the gas, being lighter than air in that it is warmer and more expanded, rises, and diffuses itself, but also that if two volumes, one of carbonic acid, and the other of hydrogen, be set free in a room, though one may descend and the other rise, they will soon come together and be united in one.

Probably the severest test to which any system of ventilation can be put is that to which it would be subjected in trying to purify the air of a police-court. Both the above systems, with others, were tried in the Leeds Burrough Police Court, where upwards of fourteen hundred pounds sterling had been expended in unsuccessful efforts to improve the ventilation. The room at best was a bad one to ventilate; and those who had experimented there had signally failed. In the description of it, the size of the room is not given; but it is lighted by means of a skylight, and in this skylight there was an opening left for the escape of foul air, but which, in reality, served as an inlet for cold air, to the great annoyance and distress of the judge who had to preside there. In this room, what is now known as the Tobin system of ventilation was tried, and with marked success.

Mr. Tobin is a retired merchant, residing at Leeds. After giving much attention to the subject of ventilation, and having made many experiments, he put his theory to a test in this Police Court. He started with the theory that there must be a steady flow of fresh air into a room, in vertical currents, which currents will rise till they touch the ceiling, and then diffuse themselves, and take the place of the vitiated air, which, giving way before the volume of fresh air pressing into the room, will escape through the first opening, wherever that opening may be, whether provided for the purpose, or nothing more than an open fireplace. It was a part of his theory that carefully prepared outlets were unnecessary, and that if inlets were provided, the outlets would take care of themselves. This he had to modify, for he found in practice that outlets must be provided, and at all points above the inlets; and, as the inlets in his system are nearly as high as one's head, it is apparent that the outlets must be near the ceiling. The Tobin system, as applied to the Borough Court, is thus described: "Three horizontal shafts were placed under the floor, all connecting with the open air. From these horizontal shafts, he led eight vertical shafts into out-of-the-way corners of the Court, each of them being five inches in diameter, and rising four feet above the floor. These pipes have open mouths, from which an unbroken current of the outer air ascends, like a fountain, to the ceiling, carrying upward the impure atmosphere, and driving it through the orifice that had previously occasioned the magistrate such inconvenience. No draught whatever, it is said, is now felt in the room, except when one puts his hand directly over the open mouth of one of the vertical shafts, and the air inside the court is as pure and sweet as that out of doors."

On the strength of this experiment the system was tried in a ward in St. George's Hospital, containing nine beds, with the following result. "Four vertical semi-circular tubes were placed in the room, each with a radius of two and one-half inches. Through each tube a continuous current of air is perceptible, varying in its rate of flow. The current only spreads near the ceiling, and no draughts are felt by patients sitting round the fireplace, or lying in bed, though the heads of some of those in bed are within a foot of the tube's mouths. The air remains sweet at all hours with the doors closed."

But whilst these experiments prove that the Tobin system is correct in principle, and has accomplished more than all others, we are still left with the conviction that no system of ventilation will work equally well at all seasons and at all times, for much depends on the state of the atmosphere. If the external air is heavy and inert, it will be difficult to secure a proper circulation, even if the chimney flue exerts its influence to promote a current, and it is only when there is a change in the external air that a uniform flow may be depended on. To accelerate the motion there should always be a certain amount of heat in the outlet shaft. This is easily secured in cold weather by means of the chimney; but to secure a like result at other seasons of the year, we must resort to burning gas in the outlet-shaft to rarify the air. Without such aids there can be no thorough ventilation.

Mr. Briggs, in his report on the ventilation of the Capitol at Washington, says the Tobin system is substantially that first employed in the Hall of Representatives; and he holds that the Tobin pipes "must be quite unsightly, and would not meet with favor, except as a resort." I am not prepared to discuss the merits of this system, but the architect who could not introduce the Tobin pipes in a sightly manner must be wanting in constructive ability.

CHAMPLIN.

PHILADELPHIA BRICKS.

PHILADELPHIA.

PHILADELPHIA front bricks are well known for their quality, although bricks are made in Baltimore which are considered equal to them, and Washington has clay which will make even a better brick. But the color of the Philadelphia brick has given it quite a preference outside of this city: this color is due in some degree to the sand used in sanding the bricks before they are put in the kiln; but of course it comes principally from the mixture of clay and loam of which they are made, and the careful selection which requires a well-practised eye in separating the shades after the burning. The number of bricks made in this city is about 400,000,000 per year, of which 50,000,000 are machine-made. Several establishments are turning out good machine bricks; but until very lately, although a great number of machines have been invented, and a great deal of money lost on them, no good strong brick were produced by this means.

The attention which has lately been given to ornamental brickwork has brought about many suggestions, and several examples of forms and modes of coloring. Glazed enamelled surface bricks are used for inside work, but have not appeared as yet to any extent for outside use; and the variety of colors used with the ordinary red brick is limited.

The white or light buff brick, from Sayreville near Easton, somewhat similar to a fire-brick, is uneven in color, frequently stained with green, and looks very raw in the wall. The black-surfaced brick, colored by dipping hot in tar, has a very good effect in the wall, but does not seem so honest as the old black glaze which we see in buildings of the last century. The white deposit which appears on many of our brick walls in this cold weather, according to a report presented to our Academy of Natural Sciences, is due to a sulphate of magnesia; the magnesia

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occurring in quite a large percentage in the mortar in which the bricks are laid, and sulphuric oxide being a product of the combustion of mineral coal in the houses or floating over the city. It is also customary to wash down a front with diluted sulphuric acid, after the building is finished, to take off the small particles of mortar which may be left on the surface; though this is a modern custom, and will not add any thing to the account when we consider the fact that the old walls are of late affected almost as much as the newer ones.

It is to be regretted that the report of Mr. William H. Dougherty's analysis of this subject, which was read before the Academy, does not suggest a remedy; however, we may hope that the attention of scientific people having been directed to this blemish, the antidote may soon be forthcoming.

A TREATISE ON IRON ROOFS.

A CORRESPONDENT has sent us the following letter of inquiry: —

EDITOR ARCHITECT AND BUILDING NEWS.

Dear Sir, — Will you please to inform me whether you know of any good American treatise on iron roof construction? I have Campin's. If you know of any please let me know through the *Architect*, as I am a regular reader of it.

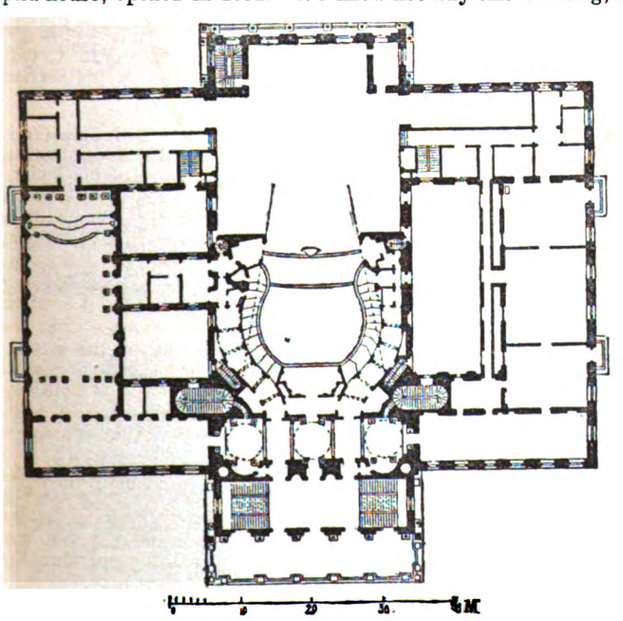
Respectfully, T. D. E.

WE have not been able to find any American work on the construction of iron roofs except that of Campin, which our correspondent already has. The best suggestion we can make is to study the framing of his roof as a matter of strains, independently of material, and then to study the handling of the iron by itself. For the handling of the iron a good deal of useful suggestion will be found in the books published by the various iron manufacturing companies; and the best examples in the descriptions published of special structures, bridges, and roofs, in the engineering magazines. For the computation and distribution of strains, we would recommend Prof. Green's "Graphical Analysis of Roof-Trusses," reprinted from the *Engineering News* by Geo. H. Frost of Chicago; Shreve's "Strains in Bridges and Roofs," published by Van Nostrand; and the chapters on the subject in Rankin's "Civil Engineering." If our correspondent had favored us with his address, we could have answered him more directly and promptly.

JOURNEY OF AN ARCHITECT IN THE NORTH-WEST OF EUROPE.[1] — VIII.

THE OPERA-HOUSE AT HANOVER.

As we returned into the new town, we perceived at the end of a large square ornamented with plantations of trees, a vast edifice, which at first sight seemed larger than it really is. This is the new opera-house, opened in 1854. We know not why this building, a



specimen of Italian architecture, has been erected in the midst of this new Gothic city, and we were not able to ascertain the reason; but the opera-house at Hanover, such as it is, deserves a visit. The carriage entrance is a covered space under a porch, wide enough to allow two carriages to pass each other without inconvenience; visitors on foot enter by two side doors which are reserved for them, and they thus escape any danger from the horses or the wheels; afterwards those who come either on foot or in carriages meet in the vestibule in front of the ticket-office. To the right and left, two winding staircases, the steps of which are more than six feet wide, lead to the floor containing the first tier of boxes; secondary staircases lead to the second, third, and fourth tiers. Each tier contains twenty-two boxes, and besides there are the stage boxes, and the grand royal box, which, as in the Italian theatres, occupies the centre of the house, and the height of two tiers. The king had also a private stage-box allotted to him; he reached it by a special staircase leading from an inner court-yard, where the escort and the carriages were stationed. The "*foyer*" is on the first floor. It opens on a terrace, which during summer evenings forms an

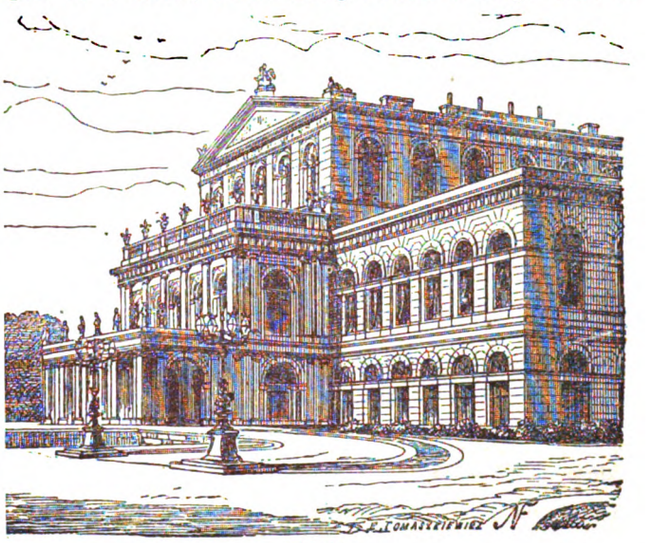


Fig. 98.

agreeable promenade for the spectators. To this *foyer* is attached an immense refreshment-stall — an indispensable accessory to all places of public resort in Germany.

Besides the theatre, properly so called, there is a concert-room containing 430 square yards. The principal entrance is through the *foyer*. Being lighted by windows on both sides, this hall serves also for meetings in the day-time. The opposite wing contains the rehearsal-room, three rooms for the practice of the ballet-corps and of the musicians and dramatic artists, with rooms open to the air in order to isolate them from the rest of the building, and to avoid noise; and then, at the back of the stage, the various offices and accessory rooms, the wardrobe, and the dressing and retiring rooms for the actors.

This building, as we have said, is entirely detached, and placed at the highest part of a large open space. This position gives it importance, and it appears higher and more elegant than it really is.

Its façades (fig. 98) have, on the whole, a grand appearance. The details are wanting in originality, but are very simple, and kept under due restraint. The proportion of the various stories, and their dimensions when compared with the main body of the building as seen from without, are too uniform. There is also another more serious defect. This building — the idea of which has been derived from an architectural style belonging to another country, and under a climate less rigorous than that of the North — has the great disadvantage of having roofs formed into terraces, a deplorable condition in a damp country, under a dull and cold sky; and although it is only twenty years old, it already shows traces of deterioration, which will only be aggravated by time.

[1] Printed by permission from the advance sheets of a Journey of an Architect in the North-west of Europe. Translated from the French of M. Félix Narjoux. James R. Osgood & Co., Publishers.

NOTES AND CLIPPINGS.

THE WASHINGTON MONUMENT. — The board of army engineers who were ordered to examine the Washington Monument and the foundation upon which it is built, after a careful examination of the work already done, and of the strata beneath the foundation, have ordered further work to cease, it is said. All the members agree that the monument could not be completed according to the original design, because the foundation will not admit of more weight being put upon the monument. The foundation was originally placed eight feet below the surface, and has now settled eight and three-quarter inches. The board directed Gen. Quincy A. Gillmore to prepare the report. The report is expected some time next week.

CAVING IN OF A COAL-MINE. — At midnight on the 19th inst. the ground overlying one of the largest and oldest mines owned by the Lehigh and Wilkesbarre Coal Company dropped down some ten inches, owing to the caving in of the mine. The houses built upon the ground, which measured about ten acres, were badly shaken, and their occupants were much alarmed: fortunately no one was injured.

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FALL OF A BRICK BUILDING. — A two-story brick building at Barr-ville, O., which had been condemned as unsafe, and was being pulled down in consequence, fell while being demolished on the 23d inst. The workmen narrowly escaped with their lives.

A FOUNTAIN ON A CHURCH-STEEPLE. — The Virginia (Nev.) *Enterprise* says: "Last evening the eyes of hundreds of persons on the streets were directed toward the top of the spire of the new Catholic church, where was seen a fountain spouting numerous jets high in the air. A large iron pipe is carried up through the steeple to the large cross. The pipe then takes the form of the cross, behind which it is hidden, and from holes perforated at proper intervals the jets are sent up. From the top of the cross, and from the end of each arm, large streams ascend to the height of about twenty-five feet, and between these are thrown up a great number of smaller jets. The height of the top of the cross from the ground is one hundred and seventy feet; and last evening, the air being calm, the numerous jets spread out in the shape of a fan. The rays of the declining sun fell upon the jets and spray at just the proper angle to light up and bring out the whole in a beautiful roseate glow, which surrounded the top of the cross like a glory. This novel cross was not constructed for mere ornament. It is intended for use in the case of the breaking out of a large fire, as a protection to the spire and roof of the church. It is but the work of a moment to turn on the water and drench the spire. The height to which the water is thrown above the cross shows the great force of the water-works of the city."

PNEUMATIC CLOCKS. —The Philadelphia *Press* says that the new mammoth hotel opened a few weeks since in San Francisco is provided with a hundred pneumatic clocks. They are made after a recent invention, by means of which the exact astronomical time can be kept at the remotest points in such a manner that there shall be no variance whatever in the movements of time-pieces, public or private. Since Feb. 25 this same system has been applied in Vienna. The agency used is compressed air transmitted through subterranean tubes, and obviates the uncertainty attending the use of electricity. The astronomical time is now precisely the same in every part of Vienna.

TUNNELLING NIAGARA RIVER. — It has been again suggested that a tunnel under Niagara River should be built.

THE DIGHTON ROCK. — The facts concerning the Dighton Rock are said to be that some twenty years ago Mr. Niels Arnzen of Fall River purchased it of the land-owner, and seventeen years ago conveyed it to the Royal Antiquarian Society of Copenhagen, which is the owner now. Recently, on occasion of the movement to transport the rock to Boston, Mr. Arnzen wrote to the above-named society, advising a conveyance by them to the "Dighton Rock Club" of Boston; and a letter has been received from the society consenting to the proposition.

BOUCHARDON'S FOUNTAIN AT PARIS. — It has been decided to leave Bouchardon's famous fountain in its present position in the Rue de Grenelle St.-Germain, as it was ascertained that the site to which it was to be removed was so undermined by old quarry galleries as to render it too weak to support the fountain. A project to open a new street in front of the fountain so that its façade might be properly seen has also been abandoned because of its cost.

L'AVENUE DE L'OPÉRA. — It is proposed that henceforth the newly opened avenue in front of the Opera House at Paris should be called L'Avenue du Grand Corneille.

TUNNELLING THE SIMPLON. — The proposed tunnel through the Simplon, for which calculations and drawings are now making, will be about eleven and a quarter miles (18,340 mètres) long.

THE SUEZ CANAL. — The scheme of connecting the Red Sea with the Mediterranean occurred in turn to Sesostris, Alexander, Cæsar, Amrou the Arab conqueror, Napoleon I., and Mehemet Ali. The Egyptians themselves under Neco, who ruled about 617 B.C., commenced a canal, traces of which are still visible, which was to unite the Red Sea with the Nile; this canal was completed by Darius the Persian, when he overran the country about a hundred years later. M. de Lesseps says that this canal was in existence "from the Roman conquest to about the fourth century before the Mohammedan era, and again during one hundred and thirty years after the Arab conquest." Napoleon I., during the Egyptian campaign, appointed a commission to consider the advisability of re-opening this canal; but the commission reported that it would take ten thousand men four years to clear it out, and that at a cost of eight million dollars, and half advised him to undertake a canal by the route afterwards followed by M. de Lesseps in 1854.

BRASS PLATING. — Brass-plated goods are coming into use in this country; and the process promises to become of great practical value in the arts. The process, as described by Herr Hess, is as follows: The first step is to thoroughly cleanse the articles, either by means of emery, or by laying them over night in a weak bath of sulphuric acid. They are then to be washed off with a weak soda solution, and immersed as the cathode of a bath consisting of two and one-half parts of sulphate of copper, twenty parts of sulphate of zinc, and forty-five parts cyanide of potassium, in three hundred parts of water. The anode should be two plates of zinc and copper of equal size. The color of the resulting brass coating may be modified by varying the depth of immersion of one or the other of the plates. The galvanic current should be a strong one, and the liberation of hydrogen bubbles on the object to be brassed should be plentiful. It is important, however, to note that the objects should be first coppered, to insure a strong attachment of the brass coating.

WESTMINSTER ABBEY REGISTERS. — A splendid contribution has been made by an American antiquarian, Col. Joseph L. Chester, to English literature, in the form of an annotated edition of the *Westminster Abbey Registers*. Having regard to the careful and exhaustive researches which have been made in its preparation, costing many years of patient literary labor, it is somewhat surprising that so few references occur to interments of members of the architectural profession, which are, indeed, fewer in number than those relating to workmen in the building-trades. Under date of March 23, 1668-9, we find "Sir John Denham near Mr. Chaucer's monument." His will contains one bequest that is worthy of notice. "Stating that he was 'Surveyor-General for the rebuilding of St. Paul's Church, London,' he gave all his fees, being twenty shillings [$5] per day, 'towards that noble and pious work, and also £100 [$500]' as a further remembrance of affection to the same." April 24, 1674, "Coll. Bushell, in the cloisters." This, Col. Chester observes, is "in the unofficial register only, and it is a notable illustration of the value of that document, as it settles a long-disputed question as to the place of interment of a somewhat eminent man, which the absence of the entry from the official register left still in doubt. The entry refers, of course, to the well-known Col. Thomas Bushell, the speculative and generally unsuccessful engineer, farmer of the Royal Mines." In 1636 he "constructed certain remarkable water-works at Enstone in Oxfordshire, and subsequently he engaged in more extensive enterprises in the mining regions of Wales. . . . Ill fortune, however, clung to him; and according to Aubrey, he died £120,000 [$600,000] in debt." Feb. 23, 1696-7, "John Tufnell," mason to the Abbey for twenty-three years. Feb. 24, 1703-4, "Nicholas Collins, formerly the college bricklayer," of whom "the Chapter Book under the date of 16 January, 1687-8, recites that Collins, the bricklayer, was dismissed from his employment, and he and his family were ordered to quit the singing-man's house in the cloisters which they occupied." Feb. 24, 1703-4, "John Gregory, the college carpenter." Sept. 11, 1719, "Capt. Edward Tufnell, mason to this church and college," according to his monument "he was mason to the Abbey for twenty-two years, and restored and decorated the south and east sides of the church." Feb. 5, 1720-1, "Ralph Sims, clerk of the works to this church," who in his official capacity kept the Funeral Books. Jan. 29, 1724-5, "Mr. William Dickinson, surveyor to this church, in Solomon's Porch," who was in the reign of Queen Anne, clerk of the works. "The Chapter Book records the payment, 17 May, 1732, of fifteen guineas [$79] to his widow, for some of his drawings." March 10, 1792, "Robert Adam, Esq., in the South Cross." He was "one of the celebrated architects to K. George III., which office he resigned in 1768, on becoming M.P. for the county of Kinross." March 18, 1795, "Sir William Chambers, in the South Cross." He was "the celebrated architect and surveyor-general of the Board [Office?] of Works, F. R. S., F. S. A., and treasurer of the Royal Academy. He was the architect of the present Somerset House, in the Strand." June 13, 1808, "John Hodskin, in the North grass-plat," who appears to have been a "laboring carpenter" to whom gratuities had been given by the Dean and Chapter. Sept. 28, 1813, "James Wyatt, surveyor of this collegiate church, in the South Cross." "According to the Chapter Book, he was appointed, 23 Jan., 1776, both 'fabrick surveyor' and 'college surveyor.' He also held the post of surveyor-general of H. M.'s Works. He was the most popular architect of his day, and among his best known designs may be mentioned Fonthill Abbey, Cashiobury, Hanworth Church, the old Pantheon in Oxford Street, the Palace at Kew, etc." Jan. 27, 1818, "John Jones, in North Cloister." "According to the Chapter Book, he and his partner, Lancelot Burton, being the college plumbers, were discharged, 4 Nov., 1803, 'in consequence of the late fire at the church, caused by the negligence of their servants.'" May 22, 1860, "Sir Charles Barry, Kt.," of whom it is added that "he was R. A., F. R. S., etc., and was knighted in 1852, in consideration of his services as architect of the new Houses of Parliament."

WHAT MR. RUSKIN THINKS. — In a late number of *Fors Clavigera* Mr. Ruskin allows himself to say: "Your present system of education is to get a rascal of an architect to order a rascal of a clerk-of-works to order a parcel of rascally bricklayers to build you a bestially stupid building in the middle of the town, poisoned with gas, and with an iron floor which will drop you all through it some frosty evening; wherein you will bring a puppet of a cockney lecturer, in a dress coat and a white tie, to tell you there's no God, and how many messes he can make of a lump of sugar. Much the better you are for all that when you get home again, aren't you?"

THE CAMERA OBSCURA IN WARFARE. — One of the most ingenious adaptations of science to modern warfare has been accomplished by Gen. Chazal, the late Belgian minister of war. A camera obscura securely protected is arranged in such a place that on a table in the interior may be thrown the image of a river, — Gen. Chazal's scheme was devised for the protection of the river Scheldt, — which is protected by torpedoes, the position of each of which is accurately marked on the map upon the table which precisely corresponds to the refracted image of the river. In the case that the river is invaded by a hostile vessel, the operator sees its image moving silently over the map before his eyes until it arrives over a spot which indicates the station of a torpedo: as each torpedo is carefully numbered, the operator has but to mention the number to his watchful assistant, who instantly closes the circuit, and in another instant the electric spark has exploded the torpedo beneath the vessel. If the first torpedo fails, the vessel can hardly escape all that underlie her course.

POLE SCAFFOLDS. — A "Foreman" advocates in the *Builder* the more frequent use of pole scaffolds as offering less chance for wind to get a grip upon them, and as being more elastic than dimension stuff.

THE ST. GOTHARD TUNNEL. — Workmen are making an advance of about eighteen feet a day on the St. Gothard Tunnel.

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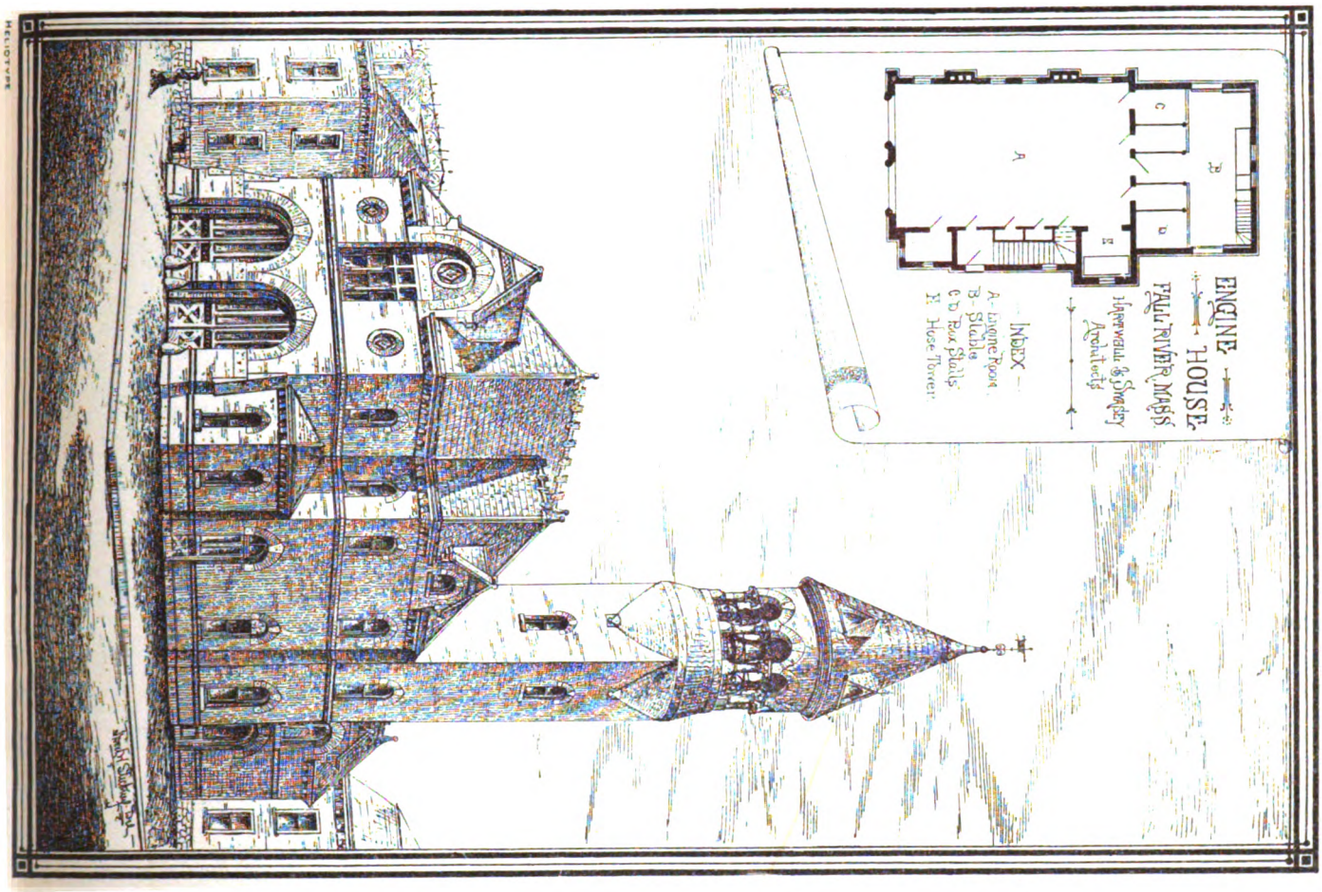

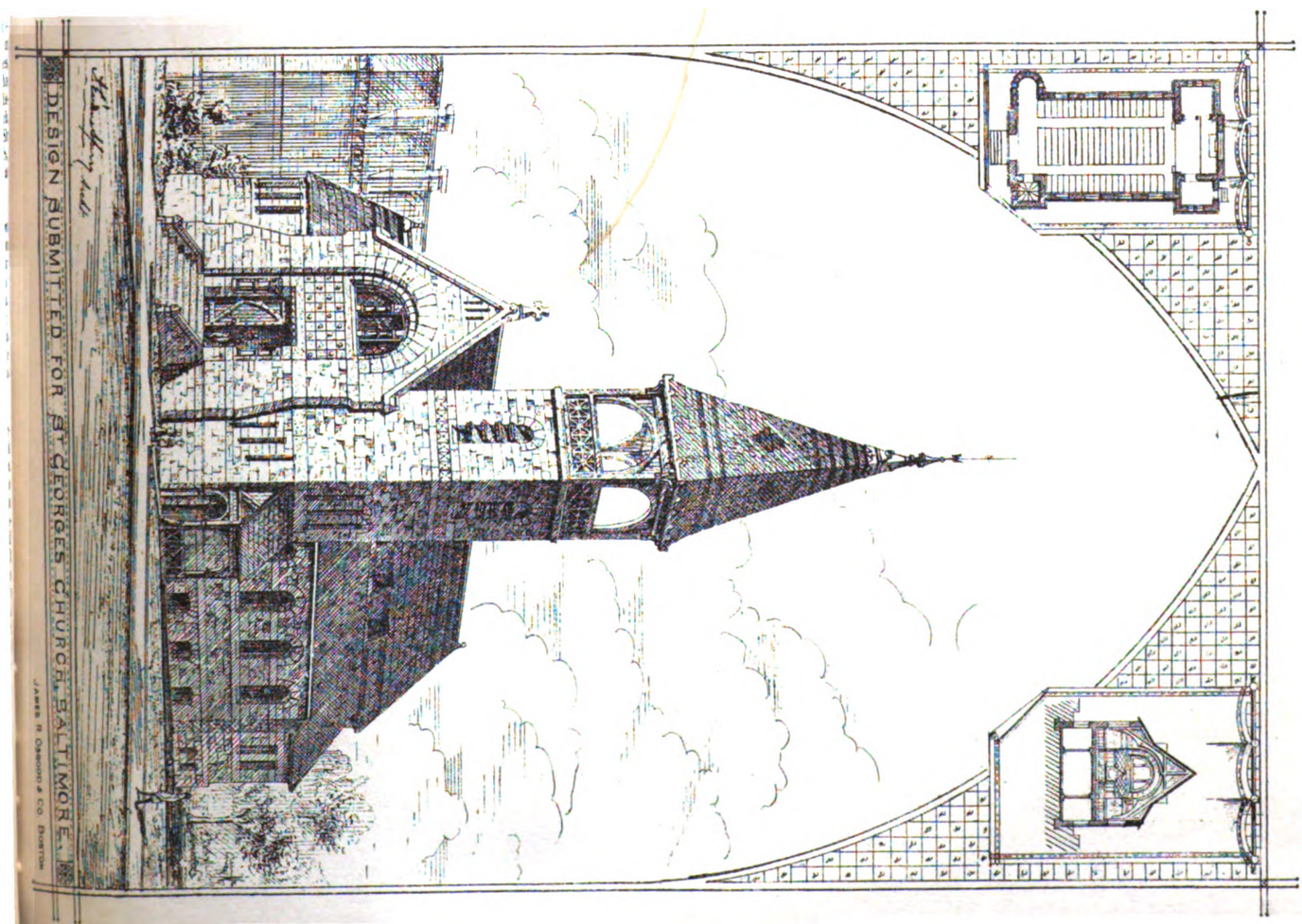

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EXAMPLES OF WOOD CARVING:

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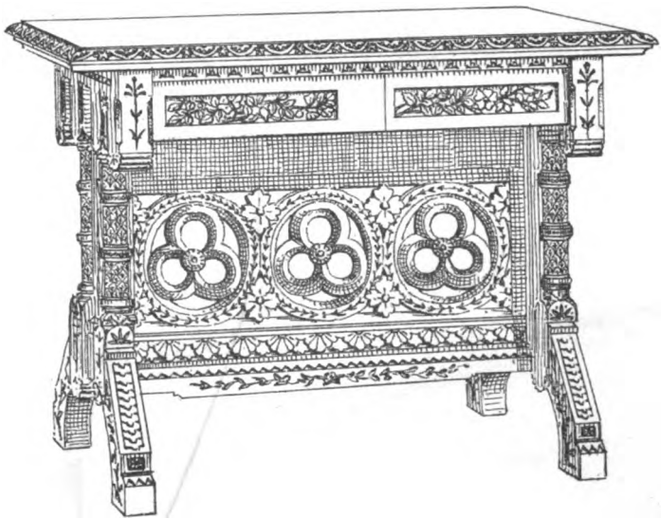

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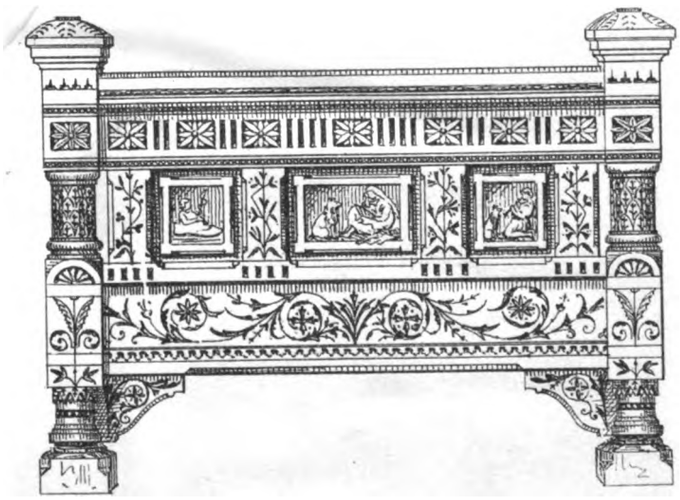

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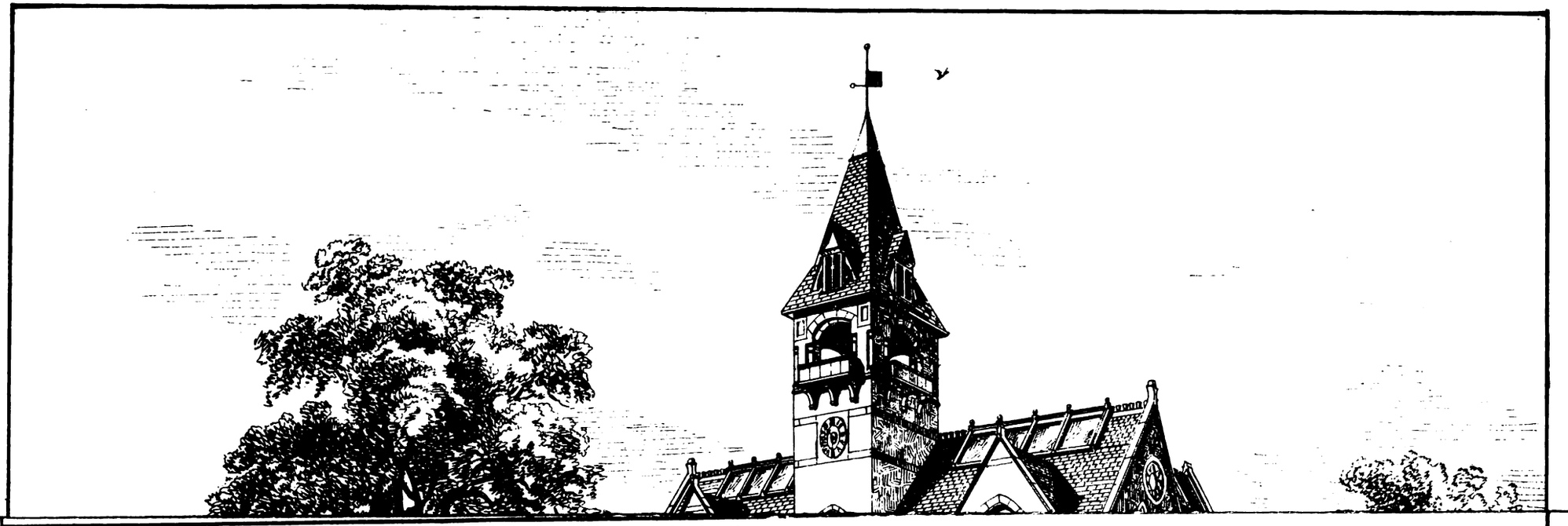

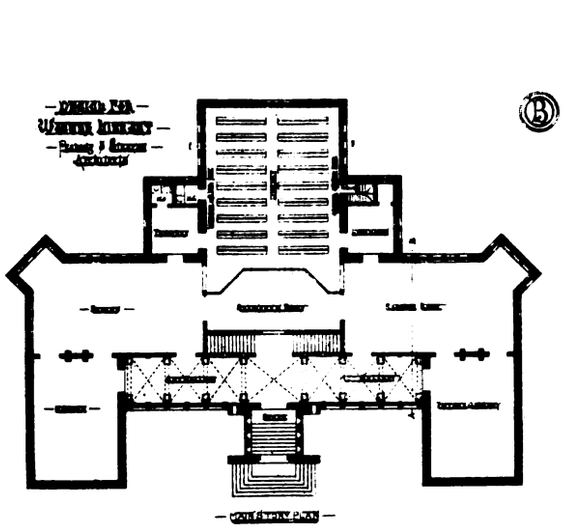

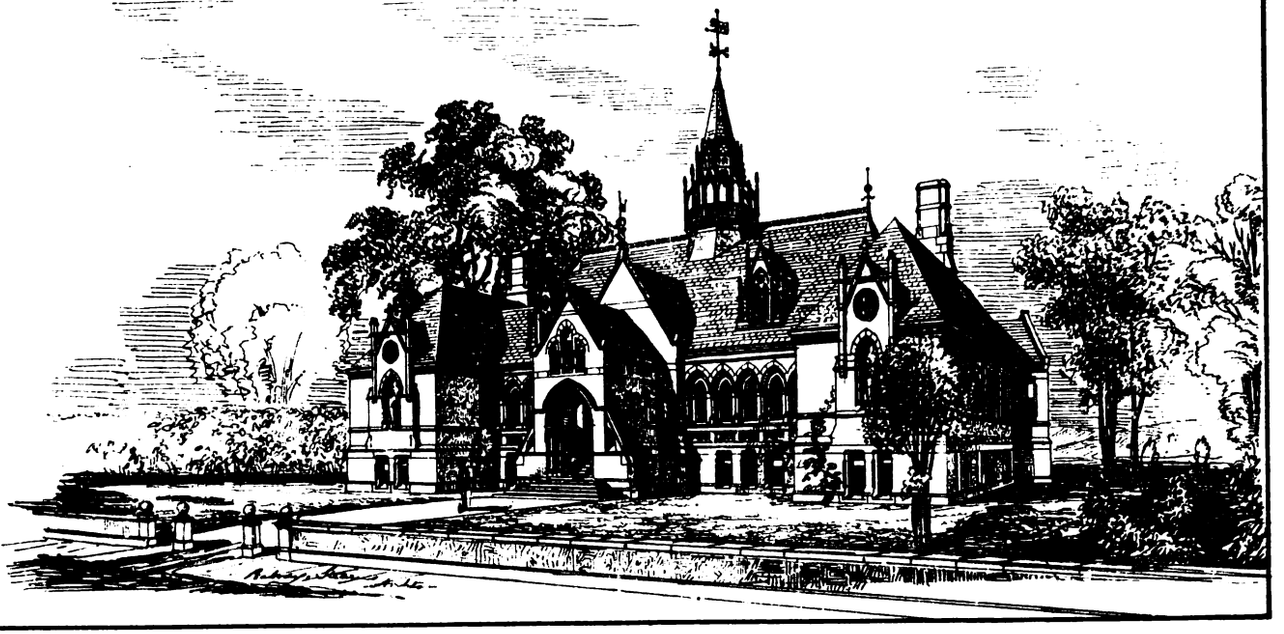

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, APRIL 7, 1877.

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THE question whether the New York State Capitol shall, after all, be finished according to the plans now adopted by the Advisory Board, was some time ago referred to the finance committee of the State Senate. A majority of the committee have submitted a report in which they record their opinion "that it was not intended or expected by the Legislature creating the present commission that the style of architecture should be materially changed. The Legislature [they say] desired to cheapen the cost of construction, if the same was practicable without lessening the beauty of the structure." They add, "The project of the Advisory Board is radically defective, not only in design, but in the treatment of the material used, — granite. The extravagant, not to say wasteful, cost of such incised and polished work as is contemplated in the 'modified design,' especially in any such material, is inappropriate to say the least, and forms a marked contrast with the bold and noble features of the existing work, where the architect has displayed great ability, especially in his treatment of the material." The estimates they report for finishing the building according to the new plans and those of the former architect are as follows: —

Amount reported according to the new plans for the completion of the entire building, including approach, stairs on east front, without terrace . .	$4,386,337 76
Cost of terrace	851,097 00
Total	$5,237,434 76
Old plans, entire building complete, including all the terraces, &c.	4,245,222 00
Difference in favor of the old plans . . .	$992,212 76

But it does not appear that this allows for the cost of removing the work which has been done under the Advisory Board, and of restoring the building to the condition for which Mr. Fuller's estimates were prepared. Notice has been given that a minority of the committee will submit a report dissenting from that of the majority.

AT a late meeting of the British Institute of Civil Engineers, there was an interesting discussion on the best ways of building for security against earthquakes. One subject of the discussion was a contrivance, called aseismatic, adopted in Japan, at the recommendation of the English Trinity Board, in the construction of light-houses, wherein the illuminating apparatus was supported on its platform by bronze balls rolling in sockets or cups (see Vol. I. p. 124), so as to break the transmission of a jar or oscillation from the earth. The contrivance was a clever one; but unluckily the Japanese keeper, getting tired of the instability of his apparatus, lashed it firmly to the platform, so that when the earthquake came, the shock was communicated and the apparatus deranged, and the test of the invention thrown away. It will be remembered that in Japan, partly at least on account of the frequency of earthquakes, the system of building is very slight (see Vol. I. p. 26). Houses are all of wood, and the roofs, the only solid parts which are firmly braced, are supported on light wooden posts without braces. These answer very well the purpose of the bronze balls in the light-house apparatus, and hardly transmit the shock to the roofs. When now and then they are shaken down, the roofs fall unbroken, and lie on the ground like hats. The few photographs of Japanese masonry that we have seen show it to be exceedingly massive, laid in large blocks of stone, with a strong batter, and with the beds of the quoins not horizontal but inclined downward from the angles so as to be normal to the sloping arrises; whether the rest of the coursing is horizontal, or all the beds inclined inwards, could not of course be seen. It is not impossible, however, that this masonry was the work of foreign engineers.

THE natural conclusions from the discussion were, that buildings to resist earthquakes must be built either of light and tenacious frames of wood or iron, free to allow a certain "working" as in the frame of a ship, or else of masonry so solid that though it may be cracked, no probable shaking will overthrow it. A wrought iron sea-pier was cited, built in Peru, half a mile long, and set on screw piles, which six years ago endured without injury the violent earthquake that destroyed the neighboring town of Arica; and also a building of like construction which had lasted through the earthquakes of twenty-five or thirty years. The solid masonry of Italy was instanced, which withstands with slight injury the heavy earthquakes that are common in the neighborhood of Vesuvius. In our own earthquake country of California, the habit of building has commonly been of the slightest, excepting in the government buildings, which are very solid. The tall chimney of the branch-mint in San Francisco was intended to be of massive masonry cribbed about with iron plating. We have no means at hand of knowing whether this construction was carried out. One curious occasional characteristic of the earthquake movement is what would seem to be a sort of rotary vibration. There was mention in the engineers' discussion of a case in Japan where the upper part of a chimney had been revolved upon the lower, and was left standing diagonally on it. This is corrobated by the case which was once described to us of the cathedral of one of the South American capitals which has suffered from an earthquake. The cathedral was built of *adobe*, and had triangular pinnacles, strengthened by running an upright wooden post or dowel through them. One pinnacle was dislocated by the shock, and the upper part of it revolved about its dowel through an arc of sixty degrees (or a multiple of it) so that its arrises stood over the centres of the faces below. We think an analogous case was noticed in a chimney at San Francisco after the great earthquake of a few years ago.

AN article in the *International Review* contains some sensible remarks for ordinary readers about fire-proof building. It reminds them that iron is a treacherous material when exposed to great heat; that to insure its safety when there is fire about it, it should be cased in non-conducting and incombustible material; that so incased wood is nearly as incombustible as iron; and that a great source of danger in ordinary buildings is the continuous openings, like flues, between the joists and furrings. It repeats the suggestion we have often heard of late, that floors should be laid with wooden beams incased in plaster, cement, or other incombustible. The popular discussions of this subject of fire-proofing are apt to overlook two considerations. The first is that we are trying to accomplish our end without paying its cost; and though it cannot be said absolutely that we never shall succeed, the attempt is rather a desperate one. We wish to put combustible materials with incombustible because they are cheap, and to prevent their burning; and while we are trying to accomplish this paradoxical aim, we neglect the obvious way to safety. The combustible materials are also the weak and perishable ones; those that will burn will decay. Whenever we are willing to look upon building-investments as those in which permanence is important, and make our structures to last as long as possible, we shall be in the way to make them stand fire. Certain obvious precautions will add to our safety without materially altering our ways of building. Such are the omission or closing of the flues between our furrings, and the exposing

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of floor-beams instead of ceiling beneath them; but these things have their disadvantages, and they do not make fire-proof buildings. In the propositions for casing wooden beams in stucco and the like, we have not much faith. If the wood is embedded in them we invite dry-rot, and our floors are likely to come down some day as did certain warehouse floors in New York lately, without warning. Whether imbedded or not we know of but one available material to cover them, — terra-cotta — which is not friable under heat, and which might not be expected to shatter and fall away if exposed to a fire hot enough and long-continued enough to endanger an iron beam; and we doubt if even terra-cotta could be made secure under such circumstances. All such materials make floors extremely heavy, and so are likely to increase the cost of them to that degree that it seems better to go farther in search of less equivocal security.

The second consideration is that there are two kinds of fire-proofing required for two classes of buildings, and it is only the less important kind that there is any difficulty in securing. The one class of buildings includes those that are safe unless they themselves take fire, — dwelling-houses, churches, public buildings, halls, and the like; buildings that do not contain enough of inflammable contents to destroy them if they themselves will not burn. These are a very great majority of buildings; and many ways of building them so that they are safe against fire are in use, at hand for everybody who will adopt them, and at a cost which is not considered unreasonable anywhere but in the United States and in England. The other class includes those, such as warehouses and workshops for the storage or manufacture of inflammable goods, which are liable to be destroyed by the burning of their contents. The fire-proofing of these has not yet been satisfactorily accomplished: to make them secure by the means at present in use, is to make them unreasonably costly and inconvenient. But they are comparatively a small part of our buildings. The means of making our cities safe from fire are available; and now that we have come to spend as much as we do on their looks, it is not reasonable to say that we cannot afford to use these means. It is not so easy, it is true, to make our houses impregnable against such fires as swept Boston and Chicago; but if our city laws insisted on the fire-proof building that can be done, such fires would never occur. Where no building burns from within, we may be sure that none will take fire from without.

We alluded last week to the proposition of Messrs. Schofield & Co. of London, to their fellow-employers, for the establishment of a bricklayers' workmen's union, to take the place if possible of the existing trades-union. The suggestions of the Messrs. Schofield, which have been published, are as follows: that the employers shall establish a fund for the support of the new union, to the maintenance of which the workmen shall contribute weekly payments, as they do now to the trades-unions; that to every workman shall be conceded (by the union, we take it) the right to work when, how, and as long as he likes; that all rules for the administration of the union shall be fixed by the workmen. Any undertaking of this kind will be watched with interest here, where conflicts between employers and workmen have become uncomfortably common. The essential point in the scheme, so far as the employers are concerned, is the provision which allows every workman to work "when, how, and as long as he likes," — that is to say, for what wages and what hours he will, we suppose. This is obviously intended to prevent compulsory striking, picketing, and rattening, and in respect of their freedom to work would put members and non-members on the same footing. How far this project, if the masters assume to carry it out, will be found attractive to the workmen, remains to be seen. They have commonly been found ready to sacrifice their personal freedom for the power of controlling each other; and to induce them to give up this power will probably require some prospect of marked advantage, especially against the influence of their leaders. The provision of a fund by their employers may or may not be enough for this, — the amount of it will have something to do with the question, — but we should think there was room for considerable precaution to prevent the workmen from capturing the fund and the union, as politicians have been found to do in this country with reform conventions, and "running" both in their own interest. We are glad to learn, by the way, that the engineers of the Reading railroad have decided almost unanimously to withdraw from the Brotherhood, rather than forfeit their positions on the road. This will be a heavy blow at the most mischievous trades-union in the United States.

Most persons who have followed the exertions of the few mediævalists among French architects, and many others, know the old Château de Pierrefonds, which, purchased as a ruin by the first Napoleon, became a pet of the second, and whose skilful restoration by M. Viollet-le-Duc has made it famous. A valuable collection of old armor, got together by the late emperor, was displayed in the great hall of the castle, and was one of its chief attractions to visitors. The empress had on her part formed a collection of Chinese bronzes, porcelains, and other curiosities, which formed the Chinese Museum at the palace of Fontainebleau, and which consisted mainly of presents made her by other sovereigns or their representatives, and by the commander-in-chief of the army that in the late Chinese war pillaged the summer palace of the emperors.

The imperial family entered a claim five or six years ago for these two collections, on the ground that they were private property. M. Thiers, then president of the republic, and his ministry, after referring the claim to a special commission appointed to consider it, made an agreement in behalf of the government to pay the heirs for it something over half a million of dollars, it is said. A second commission, appointed by the Assembly, has since repudiated this agreement, and the matter has been carried into the courts. A curious question has been raised by the claimants with regard to the collection at Pierrefonds. An early decree of the second empire, made apparently in the interest of the imperial family, orders that objects of art placed in imperial residences at the cost either of the state or of the crown shall become the property of the crown; and this has been supposed to estop the claim of the imperial heirs. The claimants, on the other hand, maintain that the Château de Pierrefonds, having been rebuilt at the emperor's private expense, was not an imperial residence; and, more singularly, that the arms and armor collected there, having been made in their day simply as implements for use, are not to be considered objects of art. The general adoption of this theory would cancel the titles of a good many things besides arms and armor, and would be a painful blow to the enthusiasm of collectors. It would probably have been a considerable surprise to the imperial collector himself, to be told that he was not gathering objects of art at Pierrefonds.

NEW PUBLICATIONS.

A PARALLEL OF HISTORICAL ORNAMENT.[1]

To include a Parallel of Historic Ornament — or an historic parallel of ornament — within the limits of ten folio plates is a feat in condensation which a bold man might well shrink from attempting. It has probably been done as successfully as was practicable in the plates executed under Prof. Ware's direction by Mr. Heinzen, and published at intervals within the last year or two by Mr. Prang, which by virtue of judicious selection and arrangement are made to present an uncommonly interesting collection of ornamental illustrations, and a better conspectus of the various types of ornament in use from the earliest days to the latest, than we should have supposed could be exhibited in the space allowed. One of the ten plates is assigned to Egyptian ornament, one to Assyrian and Persian, one each to Greek and Roman, one to Byzantine and Romanesque, one to Arabian and Moorish, two to Gothic, and two to Renaissance. We notice a marked difference of character both in arrangement and execution between the first two plates and those that follow, which sug-

[1] Parallel of Historical Ornament: A Selection of Prominent and Characteristic Examples in the Different Styles, arranged so as to present both in form and in color a Comparative View of their Principal Features. Prepared under the Supervision of William R. Ware, Professor of Architecture at the Massachusetts Institute of Technology, and at the Massachusetts State Normal Art School. By Karl F. Heinzen, late of the Polytechnic School of Switzerland at Zurich. Boston: L. Prang & Co., 1876. Price $10.00.

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gests that the directing hand must have been changed at that point. The first and second plates in fact appear to be little more than a selection of the familiar examples of Owen Jones and Racinet. But the others show a more considerate collection of materials from various sources. For the sake of systematic comparison the plan is adopted of giving first a series of capitals of different orders, periods, or nations in each style, then examples of running ornament, decoration of bands or mouldings, then surface decoration in diapers and panels, and all these when possible both in carving and color. Thus in the plate of Greek ornament we have two examples of columns in each of the three orders, a series of antefixæ, and other carved ornaments; enriched mouldings, then a similar arrangement of colored ornament first in bands and afterwards in panels, grouped about a drawing of a Greek vase. The Roman plate is arranged in like manner, excepting that as may be supposed, since no colored ornament is to be found, none is given. The two plates assigned to Gothic ornament give an opportunity to extend the system somewhat, one plate being given to carved and one to colored decoration. Here we have compactly placed in six parallel columns a series of English and French examples side by side; first carved capitals of each of the three principal Gothic epochs, then bases, then profiles of arch mouldings, then enriched mouldings, then bosses and rosettes, then carved diapers and panels. All these are so displayed as to give at a glance a comparison of the characteristic treatment of each feature at the different epochs in the two countries. In the second plate we have colored capitals of the different periods, on one side English, on the other French and German; colored mouldings and bands, diapers and surface ornament, and finally stained glass.

The care and method used in placing the examples has made it possible to give a greater number than could be expected, as many as eighty figures being shown on one plate without crowding or confusion. They cover a wide range; and much care has evidently been taken to have them interesting and typical without their being hackneyed. The substitution of the capital from the temple at Rhamnus for the usual Parthenon or Theseum is perhaps hardly an improvement; but the juxtaposition of the less familiar Corinthian capital from Didymæ with the standard example from the monument of Lysicrates is an advantage. The authentic colored Early English capital from the Architectural Museum at Westminster is an interesting example which has never, we think, been published before; and we doubt if many people even know that such a thing exists. It is an advantage to have the place-titles of the examples written under each drawing, as is here done, instead of having to consult an index. On the whole, we know of no collection of ornamental detail which has the same qualities of compactness and significance of arrangement as this; and if its compass is not great, it is for that reason more likely to be serviceable for purposes of instruction than the larger works, which are and must necessarily be very costly — a consideration that doubtless influenced the publishers in limiting it. We should have been glad, nevertheless, if they had allowed themselves one more plate, so that two instead of one might have been allotted to Byzantine and Romanesque ornaments. We miss, for instance, the characteristic cushion-capital — not a very decorative form in itself, but one of which there are ornamented examples, and the parent of a very large class of forms — and the equally characteristic capitals of interlacing bands and grotesques which are so abundant and significant in the twelfth-century architecture of Germany and some parts of France. More space here would have allowed examples of the transitional ornament of the end of the twelfth century, which, if not indispensable, is at least important in historical study, as well as interesting. Another important link which the limits of the scheme made it necessary to omit is the Græco-Roman ornament of Pompeii. The mechanical execution of the work has improved as it advanced. The earlier plates are inferior to the rest both in drawing and color, — done with as much neatness, perhaps, as the plates in the Grammar of Ornament from which the most of their material is taken, but with less spirit. The later ones are much better, not only in arrangement, but in color and printing. They are executed with admirable precision; and though they still leave something to desire in point of color, — as such prints always do for that matter, — they are without doubt, we should say, the best things that have ever been done in the United States in chromo-lithography. They are better than those of Owen Jones; and in fact, the only things of the kind that we can recall which surpass them are the famous plates of Racinet.

THE APPLICATIONS OF PHYSICAL FORCES.[1]

ONE is impressed at the outset with the attractive appearance of this book. It is a fit sequence and companion to the work on "The Forces of Nature," for which we are indebted to the same writers, and to their earlier predecessor, "The Heavens." The ease and simplicity of the translation are such that one might believe the work the composition of an English author. It serves a useful purpose in placing before the public in simple and intelligible language the evidences of how serviceable the great truths of science brought to light within the last fifty years have been made in promoting the commerce in arts, the industries, the comforts, and the culture of the world. There is a happy compound of the more amusing with the useful, and a scientific explanation of some of the marvellous tricks of conjurors, as well as of the serious labors of the man of science.

Beginning with the phenomena and laws of gravity, we have first the time-honored device of the plumb-line, and its application in the determination of angular attitudes; then the pile-driver. The latter as worked by a steam-engine is of comparatively recent invention. We should have been glad to see as the companion to the pile-driver the steam-shovel and dredging-machine, two of the most important labor-saving machines of modern times. Possibly they would have been more appropriately placed under the head of the Uses of the Steam Engine; but there we look for them in vain. The pendulum and balance, the hydraulic press, the hydrometer, the level, and the philosophy of fountains and pumps, are admirably presented and illustrated. It is evidently not always the purpose of the author to present the latest and most complete forms of apparatus for particular purposes, but rather to exhibit a form which admits of ready illustration without overtasking the comprehension of the average student.

Nothing could be better than the illustrations of the uses of compressed air, as shown in the drilling of the rock for the Mont Cenis tunnel, the pneumatic tube for letters and for railway trains, and the sinking of piers for bridges. We are introduced also to the offices of the balloon during the Paris siege, sending out altogether in fifty-four balloons 2,500,000 letters. A gentleman whose family was sent out of the empire while he remained inside the walls of the city has informed us that he sent a letter to his family by nearly every balloon, and that with one exception every letter reached its destination. The mode of returning letters to the city by the use of carrier pigeons taken out in the balloons is described under the head of Photography. The communications to be sent to the city were photographed in characters of great minuteness upon thin sheets of collodion. These sheets were carefully rolled up, and placed within small quills which were tied to the tail-feathers of the carrier pigeons. On the arrival of the birds at the dove-cote in the city, the quills were opened, and the sheets of collodion spread out on glass, and this with the aid of a microscope and camera and oxyhydrogen light thrown upon a screen, where reporters copied the communications. Optical instruments receive their due share of attention, and photography and its derivative arts are discussed in detail. So also are the applications of heat. The various forms of the steam-engine are described; and a good many inventions in which the steam-engine is only the motor are given under the heading, Applications of Steam. The many recent applications of electricity naturally occupy a considerable space, and the electric telegraph is treated at length.

The chapters on Sound are among the best in the book. We turned with hope to see how the author had treated the vexed question of acoustics applied to architecture, and though we failed to find what we wanted, we had the satisfaction to find that the writer appreciated the difficulties of the question. Public-assembly rooms he divides into three classes, — the concert-room, where the orchestra or the speaker is placed, or should be placed, in the sound focus, and where every thing is subordinate to the wants of the auditor; the theatre, where there must be two sound foci — one for the orchestra and one for the actors; and third, the hall for deliberative assemblies. It is not without surprise that we read that the walls of an auditorium should be "smooth, and their surfaces resisting and polished; large projections, ornamental masses, or excrescences, must be avoided," — maxims which, though they would undoubtedly favor great sonorousness, we hold to be removed by celestial diameters from the principles that must be observed where clearness of articulation is aimed at. Mr. Lockyer, however, quotes in a note on this passage an opinion of Gen. Scott, the designer of the Albert Hall, in opposition to this theory. A remark significant for architects is that the reason why experiments to determine the proper acoustic treatment of halls have not succeeded is doubtless that "the architects who have tried them were more engrossed with the question of art than with that of

[1] The Applications of the Physical Forces, by Amédée Guillemin. Translated from the French by Mrs. Norman Lockyer, and edited, with Additions and Notes, by J. Norman Lockyer, F.R.S. With Colored Plates and Illustrations. London: Macmillan & Co., 1877. Price $12.50.

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science; perhaps also the want of special knowledge has a great deal to do with this almost general failure." To this it may be added in fairness that the experiments necessary to settle the question are in the nature of things somewhat costly; that the persons for whom halls and theatres are built are not willing to pay for experiments, and that the architects cannot afford to.

There is no natural limit to such a work as this, nor any criterion other than individual judgment for what shall be included and what left out of the endless variety of subjects that might be admitted. Probably any reader may think of something which he would have added; but we were somewhat surprised at the absence in the discussion of telegraphy, of any mention of the electric telephone, an invention which has been the study of many electricians, and which has already yielded results of so great interest and gives promise of so great usefulness. Nevertheless the amount of material and the number of appliances that have been introduced into these seven hundred pages will excite the reader's surprise, and make the work a valuable one to persons who wish to be well informed of the general range of scientific invention, without keeping up the studies of the specialist. How much Mr. Lockyer has added to the work, it is difficult to judge; there are evidences not only in the notes but in the body of the work that he has done more than merely supervise the translation. Its dress and appearance are as handsome as might be expected by those who know the previous works of M. Guillemin. The paper and type are the best of the English press. The two colored lithographs are not excellent, but there are two very good colored etchings from microscopic drawings; and the wood-cuts, excepting a few English ones added by the editor, which are easily recognizable for their inferiority, are of great splendor.

M. VIOLLET-LE-DUC ON MODERN ARCHITECTURE.

[Translated from the Revue Générale de l'Architecture.]

THE nations of the earth who have created an architecture remarkable for its permanence are not always those possessing the strongest elements of vitality.

Man is only the better fitted to conceive durable work, in proportion to a deep sense of his own frailty. One might say it is the consciousness of his weakness, of his transitory state, that induces him to leave behind these imperishable marks of his existence. He protests in this way against the destiny which allots to him but a few paltry days of life on earth. The history of the world furnishes us with but too many examples of this contrast.

Asiatic civilization, disappearing before we are able to link the chain of its existence to that of modern times, has left behind it monuments of everlasting stability. Egyptian civilization is a thing of the past, extinguished without noise or glory. Buddhism, the creator of those stupendous structures intended to defy the effort of ages, is little else than a dogmatic nihilism fit only to lead humanity to a slow and obscure death, without hope of resurrection. From the hour that the Roman Empire set to work on the vast piles of masonry familiar to us all, its days were numbered.

The more powerful the collective action which rears these colossal masses, the feebler becomes that individual sentiment without which a civilization can neither progress nor hold together. So long as men remain possessed of great vital energy, they do little in the way of building, . . . beyond the demands of immediate necessity. But from the moment they dream of founding those selfish and defiant piles of masonry which assume to perpetuate through centuries the trace of their existence on earth, they begin to lose this vital energy; and it is safe to say that the monuments built in the conceit of being indestructible really become the last will and testament of a people.

Europe in the nineteenth century (confining one's self strictly to architecture) finds itself confronted by two opposite principles. On the one hand, by the Roman or Latin tradition, urging it to build structures expressive of illimitable duration; on the other hand, by that vital modern principle which commands it to build with the view of simply satisfying the wants of the moment. Hence appears this strange contrast (perhaps now evident for the first time in the course of ages) of an architecture whose elements cling to the past, and even exaggerate them, side by side with an art aiming only at the immediate satisfaction of public want, economical and rigorous in its nature, but subject still to the changes consequent on every new phase of society.

Certainly France is the country in Europe where these questions come up with the greatest force. Born amidst the traditions of Roman antiquity, she possesses to a greater degree than either Italy or Spain the means of reproducing its forms; but at the same time her industrial and commercial activity compels her to ignore the conditions under which the monuments of the Roman Empire were constructed, and to consult only immediate necessity.

This is so true that directly fronting an edifice built of massive blocks of cut stone (where the richness of workmanship vies with and even exceeds the value of the material, where forces are lavished as they were at a period when man understood but imperfectly their value) we see going up constructions in which an exact appreciation of strength of material, a just comprehension of immediate needs and of the employment of resources, with a due regard to the requirements of an essentially useful enterprise, have obliterated these traditions of a civilization without analogy to our own.

This art of architecture, then, has a double existence; on one side it clings to the past, on the other it strikes out independently into the future. With a little more philosophy in spirit, architects might manage a transition style, or at least agree on a compromise between bygone forms and the new ones now called into existence by modern progress and all that goes to make up an enlightened age. Unhappily they have not so construed their part: on the contrary, far from endeavoring to unite in any way the two factions, we find a great majority of professional men working back against the current of events, and even exaggerating faults in the art of building which have been charged to the Romans of the Empire, . . . prodigal use of material without reason, total disregard of economy, and the like. In this school of so-called "Renaissance," iron is employed both with brick and stone, these last two materials being frequently made to mask the supports and construction of the former; or in other words, it is easy to see that the public pays for *two* buildings instead of one.

Again, in our time marble walls are not "backed up" with brick and rubble of an economical character as in the days of the Romans, but with the best and most costly stone; even leadwork is managed so as to imitate *wood*, though at great expense. And again we see iron made to carry enormous lintels ceiled in plaster, and boxed out of sight, making evidently additional bills from mason and iron-monger.

But this "*Art of the Future*," as those who put it in practice have been pleased to term it, is evidently too costly to satisfy a society building only for its daily use, and caring little, above all, to astonish future centuries by the perpetuity and extent of its work in stone. The "*Art of the Future*" will be more modest and less ruinous in its visible effects, more useful in its immediate results.

The mistake of architects is in always presuming that we live under the Antonines, Ptolemies, or Assyrian monarchs, — a sufficiently excusable blunder, it must be admitted, since there is hardly a tendency regarded so disastrous by our present architectural chiefs, as a *desire for analysis of form out of rational principle.*

The greatness of a country is partly measured by its monuments. Very well. The question then arises, Is the secret of this power or greatness, artistic merit, or mere stability?

Secondly, another question may be put: Are the conditions which made up the strength of the Roman Empire two thousand years ago, the same to-day?

Let us state some differences which have their weight; and without looking up the Assyrian kings, the Pharaohs, or Ptolemies, let us consider simply the Romans, from whom we have borrowed so many things, . . . our language among others. The Romans under the Empire became masters by conquest (and through other less glorious means) of nearly the entire surface of the earth known at that time. Into their hands poured all the wealth of the West and of a considerable portion of the East. Exacting tax-masters, epicures of the most confirmed character, their days were numbered from the first indication of a falling off in revenue. Again, their political policy, from the time of Augustus, aimed solely to draw within the gates of Rome whatever the earth could produce in men of all races and wealth of every description. That a nation thus constituted, possessing twice as many slaves as it counted citizens, entirely independent, and without any restrictions whatever, should build monuments like those with whose ruins we are familiar, is easy to understand; and these structures are precisely indicative of a proud and selfish government. But even admitting this hypothesis, these monuments are constructed on economical principles; nothing wasted, nothing lost, every thing conforming to the means which lay in the power of these indefatigable builders. Indeed, such are the points of contact of this civilization with our own, that Louis XIV. is said to have once attempted the rebuilding of the works of the Empire in the firm conviction that he was a legitimate Roman emperor.

This is excusable perhaps in a bygone age; but we, men of the nineteenth century, where are our slaves, our serfs? Where are the tributaries to send us precious woods, metals, and marbles? Where are the foreign powers entreating to be ruled over by our proconsuls? Where are the "colons" to cultivate our lands? Where are the armies to leave behind roads wherever they pass, like a ship tracing an indestructible wake?

The monuments of Rome stand as undoubted proofs of its grandeur. Our glory lies in altogether different channels: hence the buildings which mark its progress should be constructed after other principles; and this is evident were we but possessed of the smallest dose of common sense.

Our greatness, or to speak more truly, the greatness of modern civilization, consists in the relations between immediate wants and the means of satisfying them, — between the demand and supply. Let it be well understood that I am speaking now not only of industry and commerce, but of all that constitutes the social state, intellectual and material.

To illustrate: Material prosperity increases, provided the desire for it can command a corresponding return from industry and commerce. In the same way the intellectual standard rises, if instruction, for example, be sufficiently advanced to satisfy that need of learning which makes itself felt among the masses. If you were to teach the catechism only — and stop there — to peasants

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and laborers, who need to know the elements of chemistry, physics, and mathematics, evidently the land would gain nothing, and labor would go down hill. And now (to enter more directly into our subject) if we were to instruct architects and the men of kindred branches, in none but the forms of art as practised two thousand years ago, would we not leave them outside the pale of modern society, and ignore the claims which it has a just right to impose upon them?

If you choose to regard schools of art as so many seminaries established by society to foster only traditions foreign to modern intellectual and material development, you act wisely in confining instruction to the study of certain periods of art; but if, on the contrary, we deem it necessary to raise up for ourselves architects who will labor conscientiously to discharge the duties marked out for them by society, we must of necessity submit to educate them in the principles upon which this society rests, and in what it requires.

Certes! The language of Bossuet is very fine; but if we undertook to compel literary men of our day to employ none but the forms of speech, the words, phrases, and even manner of Bossuet, they would present a poor appearance if called upon to explain or analyze certain phenomena discovered in our century.

Let poets, painters, or sculptors, write, paint, or chisel as in the time of Francis I. if they can: that is their look-out, they are responsible only to themselves and their works; the public purchases and regards these works, or leaves them with the print-dealer or in the studio. But with architecture it is different, — above all, architecture applied to public monuments.

Whether they please or no, whether the conditions are complied with, whether the funds expended in their erection be greater than the usefulness really obtained in return, they are bound to be paid for all the same; *and it is the public that has to pay*, satisfied or not.

It is folly for an architect to say that it is not for him to follow the multitude, but for the multitude to follow him; or that he wishes to lead it, guided by his own inspiration. It may be allowed Mr. X, . . . painter or sculptor, to work after the manner of Michael Angelo, so long as he buys his own canvases, his colors or marbles; but we cannot consent to this sort of thing in the nineteenth century when architects are paid from the State budget, . . . that is, out of every man's pocket. Let no one mistake my meaning.

We admit that the architect is not bound to regulate his convictions and principles by every whim of economy that happens to possess the public or those who represent it; but at the same time while maintaining his ground firmly he should have sufficient sense and judgment to measure his expenditures according to the nature and extent of the work in hand. These considerations in our mind overstep all others, for they alone make the architect other than a mere speculator or frivolous artist, placing his own vanity before the interests of all.

One of the points most worthy of admiration in the architecture of the Greeks and Romans (though entirely unlike in themselves) is the exact measure of *means employed* in proportion to the importance and destination of the building in hand.

It is the sincerity of the constructor who cannot deceive as to the value of the material employed, and who uses his resources with economy, that is to say, proportionally to the importance or requirement of the programme.

Architects who wish to study these arts (Greek and Roman) from this point of view do well, and may learn much that could be practically turned to account in our own time; but in order to do this properly they should be deeply impressed at the outset with a sense of the requirements of modern society.

These requirements are of two kinds: on one side they are purely physical, they depend upon the nature of materials furnished by modern industry, and upon their uses, quality, and market value; on the other side they have a more elevated character, and proceed from a desire for what is truthful, sensible, methodical, exact. And it may be said here, that great progress has already been made in the public mind notwithstanding persistent efforts on the part of many professional men, who dare to regard this same public as an infant to be amused with playthings and gewgaws.

It cannot be allowed any professional body to-day, having to deal with public interests, to hide its responsibility behind a worn-out dogma, or to act without giving in return some account of the motives which govern it.

But to speak the truth, it should be the public's own business to make known its wishes, and say what it wants.

True, it has been held in absolute ignorance of all architectural forms, has been taught even to believe that architects obey certain mysterious rules known only to themselves and the initiated; but has it been always thus? Can we not find certain epochs during which the public, on the contrary, without being made up of architects, lived with its architecture as we live in the garments that clothe us?

It must be admitted that these questions have their importance.

Far from believing that in our day it is the artist's business to guide public taste, and to dictate opinions, I hold on the contrary that it is for the public to manifest a taste and an opinion in consulting its proper judgment, independent of the affectations and prejudices of schools.

There is a great future in store for us. Let every man open his eyes.

THE ILLUSTRATIONS.

DESIGN FOR A SEASIDE COTTAGE AT LONG BRANCH. MR. CARL PFEIFFER, ARCHITECT.

(113 Broadway, New York, N.Y.)

IT is proposed to build this house at Long Branch. The basement and first story to be of brick, the second story and attic of frame work covered with slate on the outside. The basement is to contain the kitchen, laundry, storerooms, etc. The interior walls of first and second stories are to be finished with wainscoting from floor to ceiling. The ceilings will show the beams and finish with wood panelling.

DETAILS OF THE FIRST CHURCH, BOSTON, MASS. MESSRS. WARE AND VAN BRUNT, ARCHITECTS.

(2 Pemberton Square, Boston, Mass.)

DESIGN FOR A BAPTIST ACADEMY AT OWATONNA, MINN. MESSRS. DUNNELL AND BROWN, ARCHITECTS.

HALLS AT THE "HAWTHORNS," MILTON, MASS. MR. G. T. TILDEN, ARCHITECT.

(29 Pemberton Square, Boston, Mass.)

PUBLIC SCHOOL BUILDINGS AT CINCINNATI.

THE forty-seventh annual report for the school year ending Aug. 31, 1876, has just come from the printer's hands; and we glean therefrom items that will be of considerable interest to architects as matters of reference. We find that the Board have spent this year for new buildings, repairs, and heating apparatus, about $115,000. Two new buildings have been erected costing about $52,000.

We give below a detailed statement of the number of buildings, seating-capacity, etc. There are 38 school-buildings, with an average lot of some 30,000 square feet. The total amount of property amounts to 29 acres. The average number of rooms per building is 15; average seating-capacity per building, 760; average cost per building, $32,500; average cost per room, $2,100.

District.	Cost of Building.	No. of Rooms.	When Built.	Seating Cap'ity.	Size of Lot in Feet.	Cost of Lot.
1st	$76,300	21	1867	1,212	100 x 210	$5,000
2d	58,500	19	74	852	90 x 200	9,000
3d	23,800	14	54	732	92 x 180	5,200
4th	52,000	10	68	522	143 x 180	30,000
5th	34,700	19	59	956	90 x 170	14,000
6th	36,000	24	56	1,424	90 x 198	2,400
7th	8,800	14	35-50-55	596	60 x 200	8,400
8th	27,900	21	35-65	1,131	61 x 150	4,200
9th	18,900	12	35-62	710	60 x 120	6,700
10th	20,700	20	46-58-68	1,050	80 x 170	3,800
11th	63,900	24	44-55-65-72	1,480	110 x 200	37,800
12th	25,600	18	58	1,108	116 x 330	9,800
13th	21,400	22	52-63	1,252	93 x 200	23,200
14th	35,600	21	51-60	1,240	146 x 275	15,300
15th	30,400	24	61-69	1,450	2,550 sq ft.	6,200
16th	23,900	10	55-67	567	110 x 330	16,000
17th	11,600	8	56	426	200 x 330	8,000
18th	6,700	10	69	500	180 x 260	9.000
19th	12,900	6	60-71	298	143 x 400	13,900
20th	72,700	21	69	1,056	109 x 243	18,200
21st	50,200	19	72	970	152 x 300	12,700
22d	75,700	18	72	927	230 x 215	
23d	.....	9	.....	462	102 x 150	1,600
24th	14,300	8	62-71	348	100 x 164	
	42,800	8	76	394	120 x 340	12,500
	16,000	4	72	184	4 acres.	
	37,600	11	76	612	100 x 200	6,000
	7,800	4	.....	209	205 x 155	3,700
	9,700	9	51-67	464	110 x 300	1,000
Intermediate Sch'l.	33,300	18	54-67	977	210 x 400	18,500
	25,400	18	62	916	80 x 153	24,000
	85,500	22	70	1,016	152 x 100	12,600
	25,400	20	62	1,064	250 x 195	35,400
Woodward H. Sch'l	61,200	11	54-67	450	215 x 220	
Hughes High Sch'l.	23,400	11	53	482	90 x 200	
Colored Schools	12,000	11	59-66-68	450	84 x 130	12,800
	6,000	7	58	200	60 x 90	5,000
	20,300	8	72	200	60 x 200	3,700
Totals	$1,200,900	554		28,885	29 acres.	$394,800

Of late years the cost of the buildings has been about $3,000 per room. Of all these 38 buildings there is not one that has any great claim to architectural merit, they having been for the most part designed by the superintendent, and if an architect has been consulted it was to act merely as draughtsman.

STEWART'S HOTEL FOR WORKING-WOMEN. — It is said that Stewart's Hotel for working-women will be ready for occupancy during the coming autumn.

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CORRESPONDENCE.

THE SEWAGE SYSTEM OF CHICAGO.

Chicago.

The presence of endemic diseases in this city during the past winter has occasioned considerable alarm; and it is only now that the cause of it is becoming generally known and being publicly discussed. These diseases have generally taken the form of scarlet fever, and several hundred children and a number of adults have died from them; though now the death-rate is greatly reduced, and there is no occasion for further alarm. The doctors have pronounced the disease to be epidemic, but there are those outside of the medical profession who hold that the causes are local and preventable; in other words, that the disease is attributable to sewer-gas. Enteric fevers have not been so prevalent. Considerable excitement was caused by the discovery that these diseases prevailed in one of our large hotels, and that the immediate cause of them was defective sewerage. In this case the proprietor of the house, who was greatly exposed on account of his endeavors to find out the cause of the trouble, died of typhoid fever.

But the defects in our sewers which directly cause disease are easily discernible by those who understand our sewage system and how it is practically executed; and I think that it will be found that the faults are not so much with the system as with the imperfect way in which it is carried out.

The drainage of Chicago has always been beset by natural difficulties, which however it is not impossible to overcome. Any one acquainted with the topography of the city knows that the original surface of the ground — or rather mud — was nearly a dead level ranging from three to six feet above the water of Lake Michigan and Chicago River. The successive raisings of grade — which it is to be hoped are now forever fixed — have brought the streets of the business portion up to fourteen feet above city datum or base line, which is the level of lake water in 1838. This is somewhat less than the grade above the lake at the present time. The sewers, which are from nine to thirteen feet below the present grade, are consequently very nearly on a level, and emptying as they do into the river and the lake, have to travel from a quarter to half a mile to find their outlets from the crowning points. They are put low enough to afford seven and eight feet basements for business buildings.

The system of street and house drainage was devised by E. S. Chesbrough about twenty years ago. Mr Chesbrough is still city engineer, and has seen the system put into operation under his administration. As far as I know, no changes have been made in the general plan. Nearly every street in the city wherein the improvements have made it necessary has a sewer. Until two years ago all the sewers needed had been put down, but since that time the increase of sewers has not kept pace with the growth of the city. This is on account of the unfortunate condition of the city finances. The Department of Public Works is now endeavoring to get appropriations for the sewers still needed, which will cost about $300,000. The level nature of the ground makes the sewers an absolute necessity to preserve the health of the people living on new streets. The public are alive to the importance of this matter above all others; for were Chicago as deficient in sewers as Philadelphia, Baltimore, and other cities, and were they as defective as those of New York, there would be no city here to-day. The extensive system of sewage and the pure lake winds not only preserve it from disease, but maintain it, notwithstanding its disadvantageous topography and other local causes which time will soon efface, as one of the healthiest cities of the whole country.

The street sewers are built either of brick or vitrified drain pipes according to the size required; and not only the streets but many of the alleys are sewered. The grades being so slight, great care is necessary in laying the sewers; and the system of inspection and superintendence over new sewers is thoroughly carried out. The man-holes are close enough to allow the sewers to be dragged. This is done by an apparatus which is carried about in winter, at which time only this work is done. In summer the sewers are cleaned by flushing. An immense tank holding perhaps five thousand gallons is in constant use for this purpose during the summer. Commencing at the crown of each system of sewers, the tank, which is mounted on wheels and drawn by horses, is filled at the nearest hydrant, then placed over a man-hole, and a valve is opened which drops the water in a column two feet in diameter. Then the next man-hole is flushed, and so on to the outlet of each sewer.

At each street intersection there are four catch-basins for street water, all of which are trapped. The streets being on a dead level, the gutters commence to pitch from the middle of each square, and the pitch is entirely given by the depth of the gutter and the contour of the pavement. In the centres of the squares the pavements are nearly level with the sidewalks. The gutters, being deep at the corner crossings, are spanned by plank bridges flush with the sidewalks, and the street pavements are eased up to this level, so that foot passage, where the streets are up to the established grade, is not impeded.

When the sewers are laid in the streets, branch drains are laid to each lot on the recorded maps of the subdivisions of property, and terminate inside of the curbstone line. Records are kept of the position of these inlets, and except in extraordinary cases property-owners are obliged to use them. The destruction of the city maps in the great fire caused great inconvenience in the laying of house-drains where no buildings had been erected previously, and it frequently became necessary to trench the streets to find their location. The same system is carried out by the gas companies and water-department, and thereby much unnecessary work and the damage to pavements in making connections are avoided. The house branches are all laid with six-inch vitrified socket pipes with a grade of one quarter inch to a foot.

The above-mentioned work is all done by contract under the direction of the city engineer. All other work from the curbstone line is done by licensed sewer-builders, all of whom are under bonds. None but these are allowed to build, alter, or clean the private sewers. As the whole underlying soil of this city is permeated with water to a point above the necessary depth at which permanent foundations can be laid, the sewage system includes the surface drainage of the whole area of the city; and as the foundation line is below sewer grade, there is no danger of any properly laid foundation being sapped. Consequently all sewers must be below the surfaces of cellars and above the bottoms of foundations. Private sewers are almost invariably laid with vitrified earthen pipes, though cast-iron pipes are not prohibited. At first pipes with socket joints were used; but finding that it was impossible to compel the sewer-builders in all cases to set the pipes with good struck or rubbed joints on the inside, the Board of Public Works made it a regulation that ring joints only should be used. The pipes were then put together without cement, the rings broken into halves, one half worked up under the joint with cement on the top, the other laid on top in the same way, and the edges then pointed all around. But there has been found to be an objection to this method, arising from the danger of the rings being displaced by digging for water-pipes or any other purpose, in proximity to the drain-pipes. Of late the department has permitted the most careful sewer-builders to use the socket pipes again, and they are now generally used for the best buildings. All sewers, if of six-inch pipes or less, must be laid with a grade of a quarter inch to a foot, but it is permitted to lay nine-inch pipes almost on a level. This is a necessity in many deep buildings. The regulations do not require traps in main house drains or at inlets for soil and waste pipes, but they are not prohibited.

Trapped brick or iron catch-basins are required in the following cases: For the drainage of any yard, area, or cellar. In the latter case a wooden box is laid along the wall through which surface water is likely to penetrate, in which is a common three-inch clay pipe surrounded with clean gravel, the joints being left open to receive the surface water through the gravel. This common clay pipe is connected by means of a tight pipe with the catch-basin, and the catch-basin is discharged behind the trap through a similar pipe into the main drain. It is also required that all kitchen and laundry sinks be discharged through trapped catch-basins located where they can be periodically cleaned. These last should be, and in the best houses are, ventilated by independent pipes, but this is not required by law. Where houses have gravel roofs the leaders must be discharged through catch-basins: these may be trapped or not as the owner elects, but if not trapped must have stone covers set in cement. In business buildings the latter course is generally taken in order to ventilate the sewers through the down spouts. No water-closet or soil pipe is allowed to discharge through a catch-basin. In long house drains it is required that man-holes, either made round like catch-basins, or rectangular, and covered with stone, be placed at proper intervals to permit the drains to be cleaned. In fact, it is contemplated and required that all drains be so placed that they can be cleaned out everywhere. Unfortunately this is a requirement that is too often forgotten. All drains to which pipes are to be attached must be turned up at their outlets.

As will be seen from this outline of our system of house drainage, it is subject to all the dangers inherent in the use of earthen pipes in short lengths with many joints. The use of cast iron would avoid these to a considerable extent, but at a much greater expense. Cast-iron catch-basins would also be an improvement over brick ones, which if in dry soil may leak and lose their water during long-continued spells of dry weather. If this occurs in catch-basins used for surface drainage, the sewer gas may work back and percolate through the surface drain made purposely porous. There is always danger that a building may settle after the drains have been put in, and disrupt them where they pass through the walls. This is as liable to occur with iron pipes as with clay. It is said by some that the holes must not be filled with masonry; but it matters not whether they are so treated or not, for if not filled with masonry, sand or rubbish will fill them, and these being generally incompressible will break the pipes just the same.

But the serious defects of our house drainage are not in the drains, but above them. The sewers are often poorly laid, and the sewer-builders are not altogether blameless; but the plumbers are at fault in nine cases out of ten. The great and fruitful source of unhealthfulness in our houses is found in the connection between plumbers' pipes and sewer-pipes, which are generally made by the plumbers. And the deadly place in every house is the bottom end of the soil-pipe. Here there is no protection from the trap of a

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catch-basin, for such is not allowed on this branch. The joints are generally made by setting the soil-pipe into the sewer-pipe, stuffing in paper or rope, and then pointing around with cement. It is easy to see how a joint may be carelessly made, and to how many accidents it is subject. Often these joints are broken by ignorant workmen employed in making repairs, or by the carelessness of other workmen who come after the plumber has set his pipes. The other source of danger in our houses is found in the siphoning of water-closet traps in upper stories, for want of vent-pipes below the traps or continuous soil-pipes to the roof. This system of sewer ventilation now so common in Eastern cities is little practised here. The fault in this case is too often with the architects in making specifications for new work.

The sickness and death which have occurred this winter, though directly caused by defective drainage, have been accelerated by meteorological causes which have made imperfections of our house sewers more evident than usual. After a very rainy autumn continued until the middle of November, cold weather set in, and continued for nearly three months without intermission. In all this time it was noticed that no rain fell and no snow thawed. Practically there was no water shed, and the sewers of the city during this time did not receive their natural flushing. Their only supply was the filth drainage of the city. This conduced to a greater fermentation and larger production of deleterious gases. Where sewers were opened during this period, the pressure of gas was enormous. In one case a sewer-builder reported to me that it was so full of the compounds of hydrogen that it ignited. This condition of affairs made all bad leaks worse, and filled houses with poisonous gases which might have escaped them for years. Another effect was the drying up of numerous catch-basins sufficiently to unseal their traps. Here was a cause of danger little suspected. There are hundreds of catch-basins in this city intended for surface drainage, which ought to be cut off from the main drains, because where they formerly took surface drainage the erection of neighboring buildings has rendered them unnecessary, and getting no water, they soon dry up. The water being below the trap levels, they only serve to disseminate deadly gases through the porous drains with which they are connected.

As every calamity has its lesson, so this one has put the people on their guard against similar dangers in the futnre, and the result will be a general overhauling of drains and soil-pipes. Unfortunately however there are very few persons who make the defects in their sewers known until they are overpowered by noxious smells or behold actual sickness. A general dissemination of information on the whole subject is what is needed here, so that their defects may be discovered in time by those most interested in them. The State Board of Health of Massachusetts has taken the right course in republishing Dr. Simon's excellent little book on "Filth Diseases and their Prevention"[1] for popular dissemination. Our Board of Health could do nothing better than distribute a cheap edition of this book in pamphlet form gratuitously.

One of the best suggestions that has been made with a view to insuring the community against the possibility of being poisoned by the gas from defective drains is to exhaust the gas by means of special furnaces having tall chimneys, or by those of engine-houses and public buildings, and thereby not only burn the gas, but produce a condition of partial vacuum in the sewers. The only danger from this would be the freezing of well-ventilated soil-pipes by drawing down cold air in winter.

L'INSTITUT DE FRANCE.

THE election of M. Charles Blanc some months ago as member of the *Académie Française* created more than the usual amount of criticism and discussion. In commenting on his election the *Builder* was led to give the following history of the *Institut* and its five component academies:—

"The constitution of the Institute, as it is called, is somewhat complex in its construction, and from its earliest days there was an indecision in its regulations. Founded by Cardinal de Richelieu some ten years earlier than our own Royal Society, the *Académie Française* received on Jan. 2, 1635, its letters-patent signed by Louis XIII. Founded a few years later (1648) the Academy of Painting and Sculpture, as it was then called, was, properly speaking, the oldest of all the French academies; for as early as the fourteenth century we find traces of the existence of an association of this nature, and the society of St. Luc had existed some time previously. In 1655 the society was definitely constituted by Cardinal Mazarin, and in 1671 the far-seeing minister Colbert instituted the Academy of Architecture. Founded in 1666, also by this minister, the Academy of Sciences only received the approbation of his royal master in 1699. The Academy of Inscriptions and *Belles Lettres* then followed, composed at its foundation in 1663, of four members chosen by Colbert; the business of this body was to prepare and write inscriptions for whatever monuments might be erected or medals struck in honor of their august master.

"These four academies created in the seventeenth century existed just as our English bodies of the same nature do at the present moment, each as a separate corporation, having no connection with each other; and thus they continued to exist till the period of the French Revolution, which entirely broke up their constitutions, and formed, *by their union*, the body now called the Institute.

"Suspected of monarchical sentiments, in 1793 the *Académie Française* was suppressed, but two years later was re-constituted, when, in 1795, the law of the 25th of October founded the modern Institute. In the beginning this was composed of simply three classes, — the academy of sciences; the class of moral and political sciences, analogous to the present academy of the same name, and to a portion of that of the inscriptions and *belles lettres;* lastly, the third class, that of literature and the fine arts, embracing what we should now call the *Académie Française*, the Academy of the Fine Arts, and that of Inscriptions and *Belles Lettres*.

"Once established, the convention gave to the Institute the power of naming the forty-eight members who were again to select the other ninety-six. By the law of 1796 it was decreed that the Institute should be composed of one hundred and forty-four members residing in Paris, of an equal number of associates chosen from the whole of the republic, to whom may be added, as corresponding members, twenty-four foreign *savants*, eight to each class. When chosen, the Institute was installed in the Louvre.

"Under the laws of 1795 and 1796 the Institute enjoyed much liberty; and hence it was that Napoleon, then First Consul, determined a change. In 1803 was passed a law by which the election of any member had to be approved by the head of the executive power. This arrangement is still kept up. A second article increased to four the number of classes, admitting this time history to a full share of honor, and separated more markedly the different other branches.

"In 1806 the Institute, which since its commencement had borne the title of *Institut National*, took the name of *Institut de France*, but it was not till 1811 that it bore that of the *Institut Impérial*. This latter is now no longer in use, and it is again called the *Institut de France*.

"The approaching days of the restoration were, however, to bring mishap on the Institute; and during the first years of the Bourbon's reign, the work of the Convention was erased, and the old academies of Louis XIV.'s time were re-established. Henceforth the mere protection of the Duc de Berry or the Duc d'Angoulême sufficed to procure an entry to the Academy. Indeed, in 1816 no less than twenty-two members were expelled from the Institute, among whom were to be found the well-known names of David, La Ranal, Sièyes, Monge, and Carnot. The revolution of 1830 brought better days to the Institute, though the government of Louis Philippe determined to leave to time the care of arranging the difficulties that had arisen. In 1832 M. Guizot, then minister of public instruction, recreated the class of the moral and political sciences, giving thus a place to philosophy, to legislation, political economy and statistics. For a long time, however, the spirit of sect pursued the elections to the Institute; and thus we find, during the reign of Cousin over philosophy, none but those who entirely agreed with his views entered the sacred pale. From that time to this, the Institute has enlarged both in science and reputation.

"Thus what is now called the Institute is composed of these five academies, — the French Academy, the Academy of Sciences, the Academy of Inscriptions and *Belles Lettres*, the Academy of Fine Arts, and the Academy of Moral and Political Sciences; these sit at the well-known building opposite the Louvre, on the other side of the Seine, at the building called the Palais de l'Institut, or the Palais Mazarin.

"Of these the *Académie Française*, of which M. Charles Blanc has just been elected a member, is composed of forty members (called popularly the forty *immortals*). They are nominated by election, and the candidates can alone arrive at the position by a personal solicitation; and after this their nomination is submitted to the chief of the executive power, just as in England her Majesty gives her consent to the election of an Academician.

"It may be remembered that one of the chief works of this *Académie Française* is the preparation of the famous Dictionary of the French Academy, the first edition of which appeared in 1694, and the sixth and last in 1835. Until the present century the French Academy, like the Della Crusca of Florence, confined its labors to the preservation of the language; since then, and for the last half-century, it has been opened to all comers in science and art.

"The Academy of Sciences, which at the Revolution took the first place among the classes then instituted, is composed of sixty-five members, divided into eleven sections; each of these counts six members, with the exception of the geographical, which has only three; in addition to these, there are two perpetual secretaries, ten free members, eight foreign associates, and a large number of French and foreign corresponding members.

"The Academy of Inscriptions and *Belles Lettres* is composed of forty members and ten free members, its chief work being connected with history and archæology.

"The Academy of Fine Arts, which received its present name at the time of the Revolution, when the Academy of Architecture was added to it, is composed, like our own Royal Academy, of forty

[1] "Filth Diseases and their Prevention," by John Simon, M.D., F.R.C.S. Printed under the direction of the State Board of Health of Massachusetts. Boston: James Campbell, 1876.

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members; it is, however, divided into five sections, — painting, sculpture, architecture, engraving, and music. It is this academy which directs the various competitions, distributes the annual *grands prix de Rome* in the five sections, presents candidates for the post of professor to the schools of art, and in many other ways directs the fine arts of the country.

"The Academy of Moral and Political Sciences, founded in 1795, was suppressed by Napoleon in 1803; nor was it till the reign of Louis Philippe in 1832, that it was re-established by the advice of M. Guizot. It is composed of fifty members, and is divided into five sections; in addition there are five foreign associates, and a number of corresponding members."

ARCHITECTS AND THE PUBLIC.

NEW YORK, March 31, 1877.

EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Sir, — In your paper of March 24 you speak of the English architectural journals as having hinted at "an antagonism between the profession and the public." From your general remarks on matters of the architectural profession, one may infer that the American public feel no better towards it. Is it not quite natural that it is so?

The conditions prescribed for the competition of the West Virginia State House, for the first and second competitions of the Indiana State House, for the Fraser Institute of Montreal, and numerous other instances, give evidence that the public has a very low opinion of architects.

One would suppose that a feeling of self-respect would have restrained the members of the profession from sending designs; but the result has shown that there is very little of this feeling in the profession. Recently a limited and paid competition took place in this city; as soon as it became known that a *job* was in the market, the members of the Building Committee were fairly run down with applicants who offered to prepare plans free of charge. I venture to predict, that when these gentlemen wish to build again they will think it foolish to offer any compensation for competition plans. There will be more than enough of the hungry wolves after the prey.

Let it be known that a piece of property has been bought with a view of building, and a run of the professionals is sure to follow: hence the contempt of the public.

The saddest thing in these scrambles for *jobs* is, that it is not confined to the lesser lights, but is participated in by a few who are quite prominent, and whose worldly position is such that they could await a client with dignity.

The professions and pretensions of some members of the American Institute of Architects are a sham and a fraud. In conclusion, permit me to allude to the pernicious practice of most architects of constant fault-finding with the work of others. A builder remarked to me the other day, that he did not believe that backbiting prevailed so generally in any other calling as in that of the architects.

In a discussion in the Albany Senate the other day, one of the senators, Mr. Gerard, remarked that architects were always quarrelling.

Very respectfully, CROAKER.

NOTES AND CLIPPINGS.

A SUIT FOR ARCHITECTS' FEES. — The trial of the case of Arthur Gilman against Mrs. Paran Stevens was concluded in Part I. of the Superior Court on the 30th ult. The plaintiff, who is an architect, sued to recover about $15,000 for professional services in the preparation of plans for a building which was to have been erected at Thirty-Seventh Street and Fifth Avenue, and about $750 as a balance due for work on the plans of the Stevens apartment-house. In regard to the first claim, Mrs. Stevens insisted there had been no contract. She also set up a counter-claim of $20,000, the alleged excess in the cost of the apartment-house, which she averred was due to the plaintiff's negligence. The trial of the suit was begun on the 21st inst., and the case was given to the jury on Thursday last. The jurors, failing to agree, were locked up for the night, and yesterday morning brought in a verdict for $3,000 in favor of the plaintiff.

THE STATUE OF AMERICA. — The bronze statue "America," which is to surmount the Soldiers' Monument in Boston, has just been completed by Messrs. Robert Wood and Co. of Philadelphia. The figure is of heroic size, 13 feet high, and weighs 5,300 pounds. The artist is Mr. Martin Milmore. The statues of the American Soldier and the American Sailor, intended for the base of the same monument, were also cast by Messrs. Robert Wood & Co. and are now awaiting transportation.

FALL OF A BUILDING. — A two-story brick house on Cameron Street, in Alexandria, Va., occupied by a family named Boswell and a maiden lady named Padgett, fell in the night of the 2d inst. One of two brothers sleeping in a bed was instantly killed: all the other members of the household were injured.

BURGLAR-PROOF CONSTRUCTION. — A bank-building and safe-depository is now being built in Milwaukee, and in the construction of its vaults the floors, walls, and tops are made of two thicknesses of rail-road rails: the whole is surrounded by heavy stone walls.

THE SARATOGA MONUMENT. — The Saratoga Monument Association have already adopted a design for a monument, but are prevented from carrying out their plans from the want of funds. The Legislature of the State made, in 1874, an appropriation of $50,000 toward the erection of this monument, but under such conditions that no benefit can be derived from it without additional legislation. A petition to the Legislature to grant such aid as will insure the laying of the corner-stone on the approaching centennial anniversary of the surrender has been prepared and generally signed.

THE BENNINGTON (VT.) MONUMENT. — The Committee on Federal Relations of the Massachusetts Legislature has reported a resolve appropriating a sum not exceeding $5,000 to aid in the erection of a monument in commemoration of the battle of Bennington, to be paid the treasurer of the association; provided that it shall not be paid until plans for the monument have been approved by the governor, and other sums received large enough to make the erection of the monument certain.

THE DOUGLAS MONUMENT. — Should the Douglas Monument, which has stood untouched for some ten years, ever be finished in accordance with the original plan, as modelled by Leonard W. Volk, it will be 100 feet high, with a circular base 52 feet in diameter, the tomb having a diameter of 20 feet. The sarcophagus, which occupies the centre of an arched chamber 10 feet high, is of white marble. On pedestals at four of the faces of the octagonal base will be figures representing Illinois, Commerce, History, and Arts and Sciences. The sides will be ornamented with bronze bas-reliefs, and the whole structure will be surmounted by a column 48 feet high supporting a bronze statue of Douglas. The first appropriation by the Illinois Legislature of $25,000, was made in 1863, and was used to obtain the site; since that time various bills appropriating sums of money for the completion of the monument have been defeated. What has been expended upon the monument up to the present time, some $12,000, has been raised by private subscription.

THE CHICAGO COURT HOUSE. — Bills for the following amounts have been audited and paid for work thus far done upon the Cook County Court House: —

Excavating	$5,600
Foundations	92,000
Plans and specifications	30,000
Cut stone	25,000
Granite	40,000
Total	$192,600

This is exclusive of Harms's claim, and also of the hire of laborers and superintendents. All that the county has to show for the money is the foundation, which was contracted to be built for $84,000.

THEATRE STAIRS. — It is said that the Lord Chamberlain has determined to grant no license to a theatre in which wooden stairs are used; and he will insist that such stairs shall be replaced by stone or iron stairs.

THE FISCAL APPROPRIATION FOR THE LOUVRE. — One hundred and thirty thousand dollars have been appropriated by the French government for the running expenses of the Louvre during the ensuing year; an amount which, in the opinion of the *Chronique*, puts that national institution in "a flagrant state of inferiority," when compared with the similar institutions of Russia, England, and Germany. The Director of the Fine Arts and the Director of the National Museums, however, seem to have exerted themselves successfully in the matter of obtaining an increase; for the latest news from Paris is to the effect that a sub-committee on the budget has been conferring with those gentlemen, and has engaged to recommend a further appropriation of fifty thousand dollars.

RUSSIAN MOUND-BUILDERS. — The Russian Government having refused to enact a law by which all the *koorgans*, or ancient and prehistoric grave-mounds which abound in Russia, should be proclaimed the property of the state, a private society is now forming for the purpose of negotiating with proprietors of land for grants of property on the *koorgans*, and undertaking a series of scientific explorations of the mounds.

CHRISTIAN CHURCH IN ALGERIA. — The oldest existing Christian church in the world is possibly one at New Orleansville (the Oppidum Tingitten of the ancients) in Algeria. In the pavement is a stone with an inscription stating that it was built in the year 328 A.D., soon after the conversion of Constantine. Several portions of the building are still in good repair.

A CENTENARIAN BRICKMAKER. — James Norris of Saltburn-by-the-Sea, England, is now in his 103d year, and still earns his living by his trade. On the occasion of his 102d birthday, March 14, 1877, he managed to load and wheel a barrow in which were twenty-three unbaked bricks, the weight of which, without the barrow, was 200 pounds.

DRAWING THE CHARGE OF A SHELL. — Four hundred and one rounds were fired during some recent artillery experiments in England. At the close a shell that was fired, but did not explode, — a one hundred and eighty pounder, — lay on the beach. To deprive it of any power of mischief by any attempt to unload it, a small four-ounce charge of gun-cotton was placed on top of the shell, and exploded, cracking the shell without exploding the powder within.

PREHISTORIC REMAINS. — In the coal shale at Wezikon, Switzerland, a series of painted fir poles covered with wicker-work have been found. They are supposed to belong to the epoch between the two glacial periods.

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PROPOSED COTTAGE AT LONG BRANCH N. J.

CARL PFEIFFER ARCHT.

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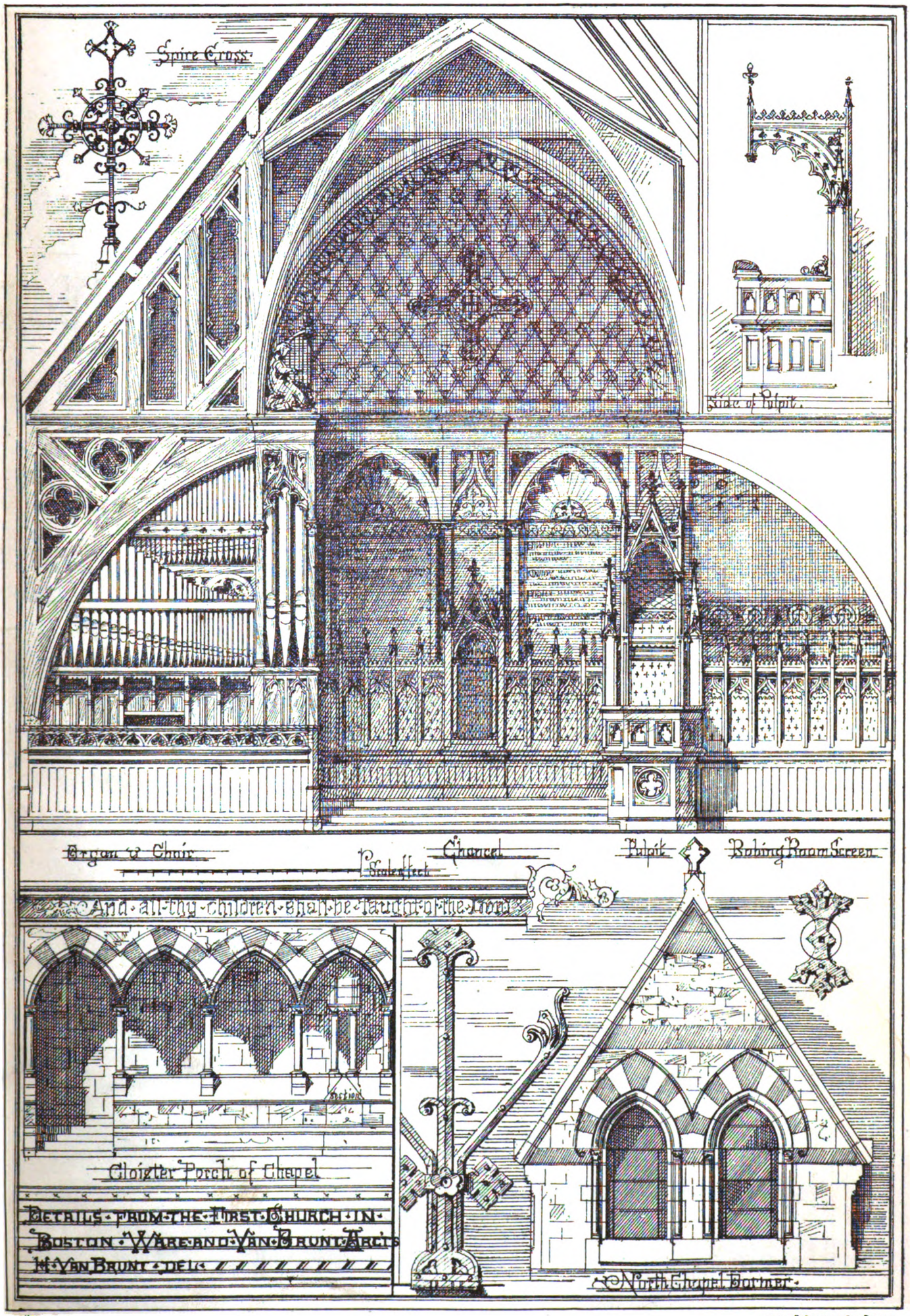

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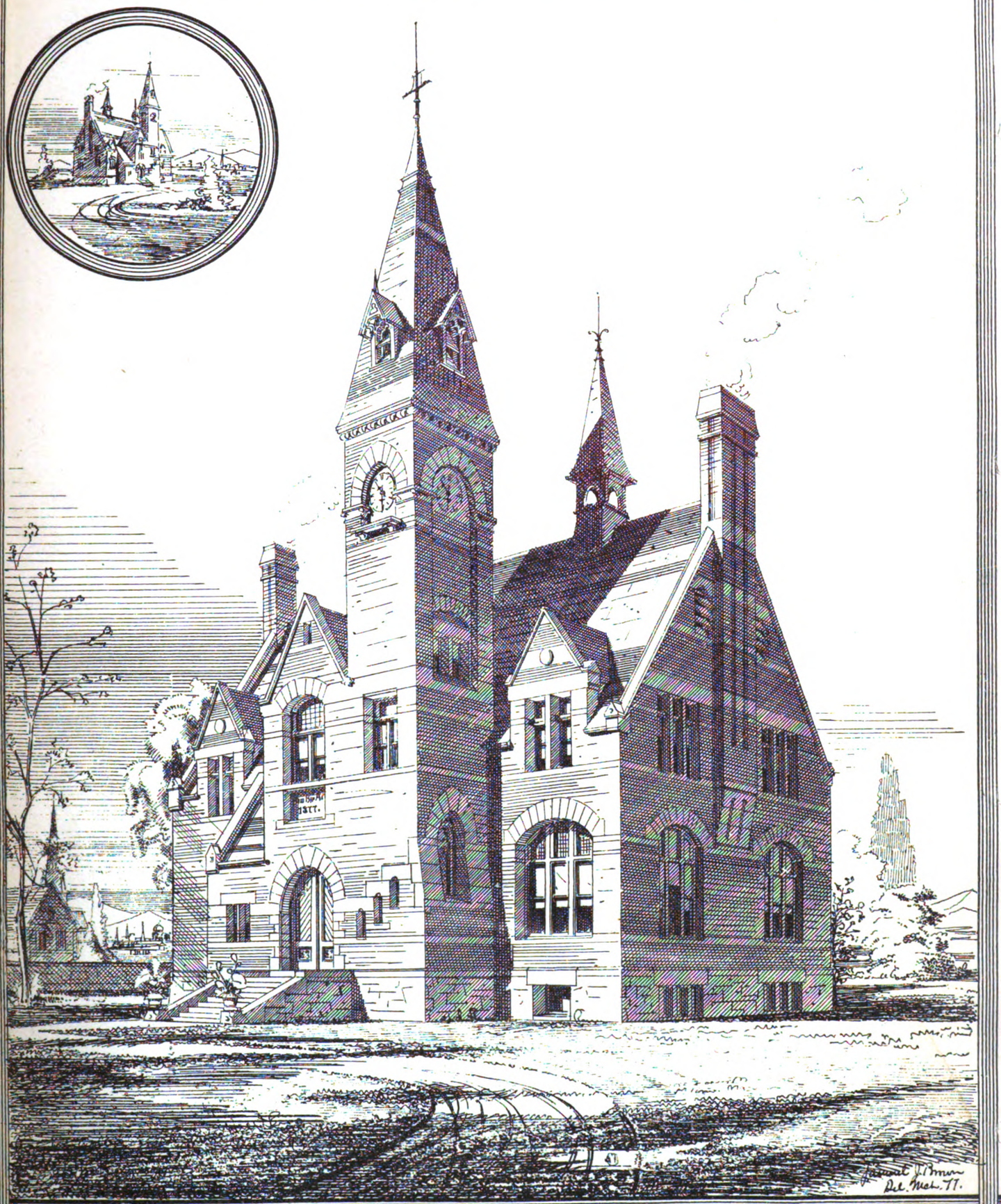

DUNNELL & BROWN ARCHITECTS, INGERSOL BLOCK ST. PAUL, MINN.

MINN. BAPTIST ACADEMY, OWATONNA, MINN.

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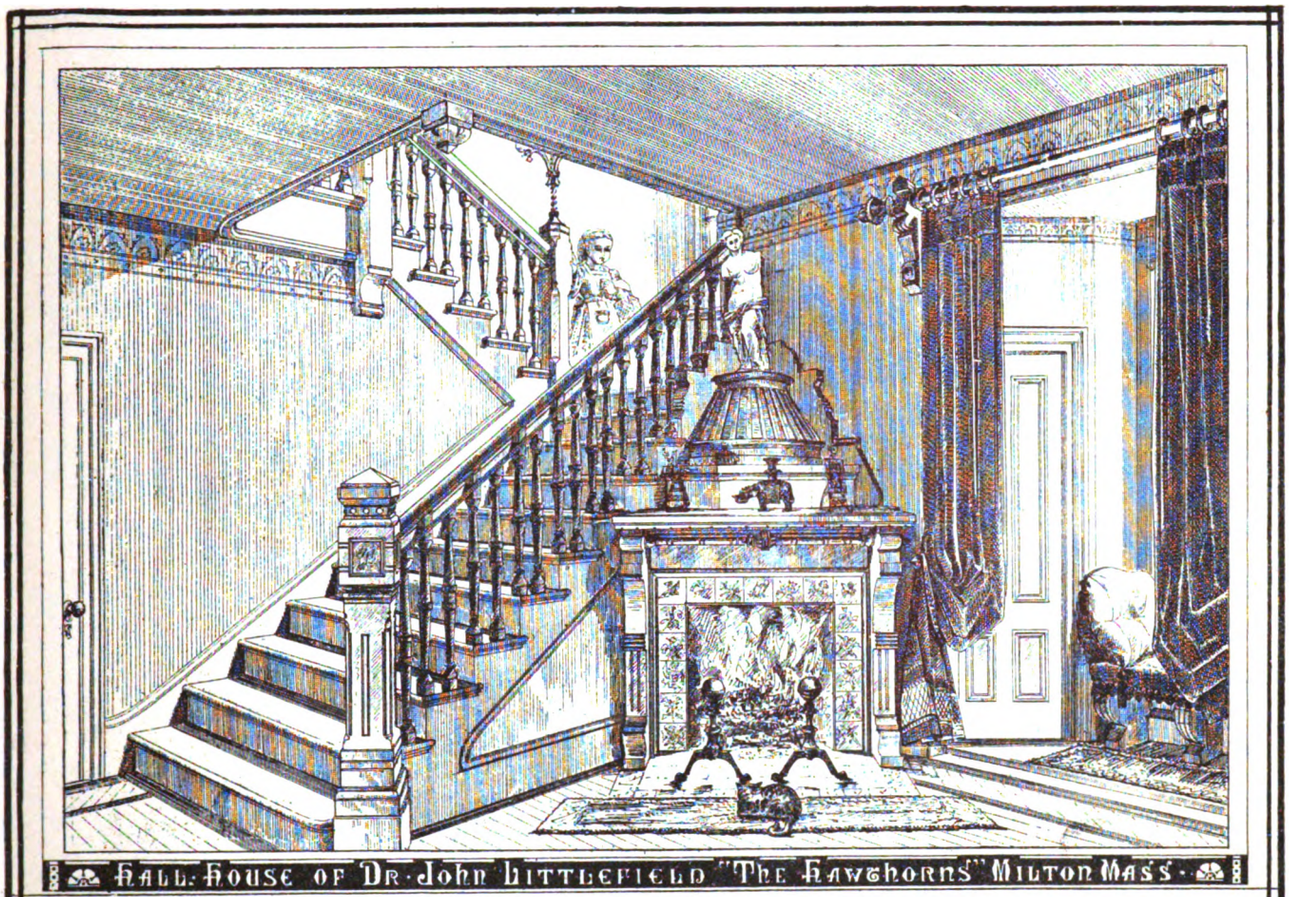
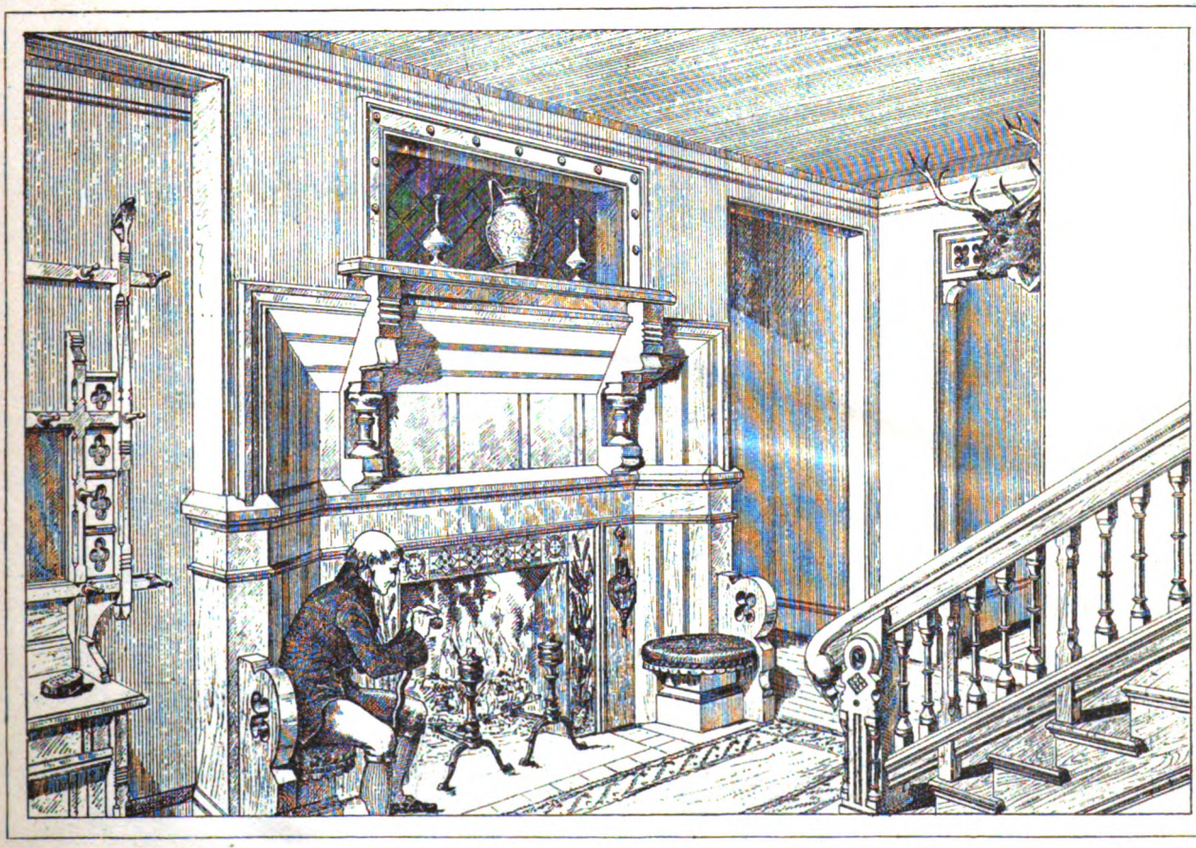


HALL: HOUSE OF DR. JOHN LITTLEFIELD "THE HAWTHORNS" MILTON MASS.



HALL HOUSE OF GEORGE T TILDEN. "THE HAWTHORNS" MILTON MASS.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, APRIL 14, 1877.

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REPORTS of the decision of the engineers who have been examining the foundations of the Washington Monument have been many, and each in direct opposition to its predecessor; but it appears that up to our date of writing no report has been rendered, and we see no evidence that anybody knows what the decision will be. Much as we sympathize with the feeling and purpose of those who would forward the undertaking, we earnestly hope, as the easiest way of sparing the country from a most unfortunate error and ultimately a serious mortification, that it will be found absolutely unsafe to continue it. At a meeting of the Monument Association last week, the Secretary gave account of a conversation which he and the Supervising Architect had with President Hayes on the subject. He said that the President expressed much concern about the monument, and was anxious to have the work on it immediately resumed, showing some feeling at the delay, and promising to do his utmost to forward the objects of the society. The President has the reputation of being a man of more culture than some of his predecessors; and we must believe that his earnestness in forwarding the present movement springs from his interest in the commemorative project rather than from any considerate approval of the unworthy design which the association is trying to press to completion. It is a misfortune that the issue has been put upon the country and upon Congress of building *the* Washington Monument instead of *a* Washington Monument. It is not likely that either the legislators who inconsiderately committed the government to taking it up again, or any considerable number of the million or two of people who will be called upon for their subscription, have formed a serious judgment of the propriety of the design that is foisted upon them as if no other could be found. But it is certain that the general voice of the architectural profession and of cultivated persons throughout the land who have considered the design condemns it unequivocally; and to have the newly awakened zeal of the people constrained to consummation of what would assuredly come to be regarded as a national folly, is a national misfortune, from which we trust the decision of the examining commission may deliver us.

CONSIDERABLE opposition has been made to a provision in a bill now before the New York Legislature which makes the Superintendent of Buildings of the City of New York subject to the approval of the American Institute of Architects, or its New York Chapter. The measure is one that has already been in force under a different law for a number of years; and though it does not seem to us of vital importance, it has some of the advantage of a safeguard. The superintendent of buildings of a large city had better be an architect; and considering how public appointments are often made for large cities, it is worth while to provide for a professional officer the security of some indorsement of his professional capability. We can think of no such security which could be provided for by statute except the approval of some recognized body in the profession to which he belongs. Among architects in the United States there is absolutely no association except the Institute, and therefore nowhere else to look for any professional guaranty. The approval of the Chapter of the Institute would not insure a satisfactory officer; but it would probably exclude an incapable or dishonorable one. The thing to be considered is not the advantage of the Institute or of architects outside the Institute, but of the city; and if the measure promises a safeguard of any kind to the city, it would seem to be worth preserving unless it entailed some counterbalancing evil, of which we see no sign here. We do not imagine that the Chapter would refuse to approve a man known to be qualified for the position because he was not one of themselves. As for the attitude of architects, it is true that the Chapter contains but a minority of the architects in New York, and that there are men of as much eminence in their profession among outsiders as among members; still it cannot be denied that of architects who are distinguished enough to have attracted the general acknowledgment of their fellows, there are more inside than out, and that the average standard both of attainment and of honorable practice is higher. Moreover, it is perfectly safe to say that there is not an architect in New York to-day, member or non-member, whose standing — if he has any — is not the better for what the Institute has done in behalf of the profession. The useful and reasonable thing for outsiders, we should say, would be to join the Institute themselves, and lend their hand to improving the state of the profession, and therewith their own. The policy of the Institute, and of the New York Chapter as far as we can judge, is not exclusive. They are glad to increase their number, and only ask of those who will join them that they shall show not an eminent but a reasonable professional capability, shall refrain from cutting each other's throats, and from receiving fees of anybody but their clients.

SINCE we have heard nothing lately of the protests and injunctions that have been proclaimed from time to time against the Brooklyn Bridge, we may presume that the shipowners who have opposed it are becoming convinced of the hopelessness of their opposition. It now looks as if the bridge would not long stand alone, if even it has not a companion by the time it is finished. The company which has been formed for building a bridge at the famous Blackwell's Island (three or four miles higher up East River), where the city penitentiary, workhouse, and insane-asylums are, selected a board of consulting engineers, Gens. Barnard and Gillmore and Mr. Chanute, and referred to them the decision between the plans that were offered. The engineers have reported that nine designs were submitted and examined, of which only two were suspension bridges pure and simple; another was a trussed cable, two were trusses (one of them a lattice truss), two hinged-arch bridges, one a "derrick," and one a "cantilever." Three prizes were awarded, of one thousand, five hundred, and two hundred and fifty dollars respectively. The first prize "for practical construction with such improvements and modifications as suggest themselves," was awarded, in accordance with the vote of a majority of the consulting engineers, to the design offered by Mr. Charles MacDonald for the Delaware Bridge Co.; the second was given to the hinged-arch project of Capt. Eads's design, offered by the Phœnixville Bridge Works; and the third to the "derrick" design submitted by Henry Flad and Co. of St. Louis. Gen. Barnard, it is said, however, offered a supplementary report in which he advocated Capt. Eads's plans as the best at all points.

BLACKWELL'S ISLAND divides the East River into two spans of upwards of six hundred and seven hundred feet respectively. The floor of the bridge is to be 135 feet above high water, and provision is to be made for a line of rail, two carriage-ways, and two foot-walks. Mr. MacDonald's design is for a form of what is called a "cantilever" bridge, consisting in each span mainly of two bracket-trusses, in general form like those used in swinging drawbridges, which, balanced on the land piers, nearly meet in the middle of the span. The land ends will be anchored into heavy abutments, and the outer ends overhanging the water for a length of 270 feet will leave in the wider span a gap of two hundred feet. The

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bracket trusses can be carried out from the shores without interfering with the use of the river, and without the risks and difficulties which belong to the building of the Brooklyn Bridge; the gap will be spanned by an ordinary truss, which, built on one of the end-trusses already in place, can be rolled forward into position when it is ready. The bridge will be wholly of wrought iron, the piers being of truss work standing on a base of granite thirty feet above high water. The character of the shores and the comparative narrowness of the spans make this bridge an easier problem than that at Brooklyn, and it is expected that it can be finished in two years at a cost of two millions and a half of dollars.

At a meeting of the Social Science Association in Philadelphia last week, Mr. Lorin Blodgett read a paper on tenement-houses, and houses for the poorer classes; a subject which is receiving much and general attention nowadays. Mr. Blodgett spoke with natural warmth in favor of the system of building-associations that is characteristic of Philadelphia, which he thinks one of the greatest works of popular beneficence that the world has known. To say that a population of 850,000 has passed through the late hard times "with scarcely an instance of serious suffering," is the language of enthusiasm; but there is no doubt that the working-classes of Philadelphia enjoy exceptional advantages. Mr. Blodgett says that the building-associations now include nearly seventy thousand members, with an accumulating capital of thirty millions of dollars. These associations, it is estimated, have in about thirty years invested in real estate more than fifty millions of dollars, having received and invested in 1875 alone seven millions and a half. Forty-five hundred houses, averaging $3,500 each in cost, make nearly sixteen millions worth of building annually. The houses are usually built in one of three forms, — two-story houses of four rooms or of six rooms, or three-story houses of eight rooms. The first cost from $1,200 to $2,500, and rent for from $11 to $18 per month; the second from $2,500 to $3,800, renting for from $16 to $25; the third from $3,000 to $5,000, renting for from $20 to $35. From one hundred and twenty-five to one hundred and thirty are built on a square of 425 feet, worth from one hundred to one hundred and twenty-five thousand dollars (say sixty-five cents per foot), and probably cover half or more than half the surface. This arrangement Mr. Blodgett thinks to be more advantageous than the improved tenement-houses that are building in other cities. Whether it would be more wholesome would depend on the planning and administration of the tenement-houses, we should think; but it must obviously be more costly, and it hardly admits of making a city secure against fire. On the other hand it has the social and political advantage of encouraging and helping the working-men to own their own homes, an advantage not to be lightly discarded. Three-fourths of the houses, says Mr. Blodgett, are owned by their occupants by the time they have been built two years.

The famous Church of St. Geneviève at Paris, better known as the Panthéon, has become conspicuous of late days, beside the richly decorated modern churches and the still more richly restored old ones of the city, for the cold grayness of its interior. It is now proposed to decorate it with mural paintings, and further to ornament it with ten colossal statues in marble. The church — lighted by great lunettes which, set above the springing of the vaults behind the parapet of the roof, are invisible from without, and a standing puzzle to the visitor, who vainly scans the imperforate walls for them — is found too dark to allow of painting the subjects chosen for its decoration directly on the walls, and they will be executed in the artists' studios on canvas, which will afterwards be stretched on the walls; a method which has been adopted in the new Church of St. Augustine, and perhaps in others. The two lateral chapels are found, however, to be light enough for painting on the walls themselves; and here workmen are already busy preparing the surface on which it is expected that the artists will set to work in another month.

By a slip in our last number we put the price of Messrs. Prang & Co.'s "Parallel of Historical Ornament" at $10. It should have been $15.

ARCHITECTS ON PROBATION.

The indications of a certain unpopularity of the architectural profession in England, which are given by various remarks of public men and expressions of the architectural journals, to which we have called attention of late, show a state of things which we are glad to believe does not characterize our own country. It does suggest, however, some of the difficulties that beset our profession here as well as there, and it also brings into prominence the fact to which we alluded a little while ago, that this very state of things marks if it does not offer the architect's best opportunity. In the United States the rapid transition of a nation whose means were small, and its ways of living simple and frugal, into a wealthy and luxurious one, tempted to profusion and display, and growing in culture as well, with its habits of life, domestic, social, and even political, only half determined yet taking shape rapidly, has required that buildings shall be devised for it that are suited to that life and the luxury and culture at which it aims. The whole planning and arrangement of dwelling-houses, and in a great measure of public buildings, have in a generation past undergone changes which may almost be called revolutionary. The use of new materials too has brought new problems. Concrete, moulded, and ornamented brick, terra-cotta tiling, iron cast and wrought, and even sheet metal, have their important uses, and should have their appropriate forms and treatment. As yet they have not, and it belongs to the architects to find them.

Herein is the architect's opportunity. His hold on the public confidence will be just in proportion to his comprehension and satisfaction of its practical wants. Wherever architects do not do this themselves visibly and successfully (in England, if that be the case there), their hold on the public will be very slight. This will have very little to do with their success in any esoteric and technical or even artistic excellence, so long as the temper of the age remains as it is now. This is not an artistic age, whatever interest in matters of art may be stirring in it here and there. The way to its heart and its rewards is through practical and not artistic success; for any profession at least, whatever may be the good fortune of individuals. Architects who devote themselves to the pursuit of architectural elegance, to the neglect of the wants which their clients press upon them, are likely to be left alone to their own devices and the sympathies of the few connoisseurs and persons of elegant tastes whose aims are congenial to theirs. The world is full of enterprising men who stand ready to supply its wants: when architects neglect them, it is ready to turn to others. No architect who has read the past volume of our journal will accuse us of not giving due importance to the artistic side of his profession. It is, we have always maintained, the highest part; but it is not more essential than the homelier part, and it is the part that cannot stand alone. Architecture is, in fact, too practical an art to be conservative. It is only when the progress of design has waited closely upon the development of material wants, that it has developed vigorously, or has kept a hold on public interest.

That such an interest is very general now is evident enough. As far as amount of work done is concerned, the last fifty years may fairly be called one of the great building ages of the world. With us, in fact, it is our first building epoch; and the general interest in building is shown not only by the amount of work done, and the growth of the architect's profession, but by the increase of our professional literature, by the general demand for information on architecture and kindred arts, for magazine articles, books of popular architecture and decoration, and for architectural and decorative illustrations of all sorts. The interest is twofold, due not only to the fact that our people want houses, churches, buildings of all sorts, in greater number and of greater importance than ever before; but to the other fact that they are for the first time awakening to a great interest in art of all kinds, one which needs no proof. The concurrence of these two conditions is enough to make architecture, for the nonce at least, the most popular of arts, and to give architects such an opportunity as they may not have again here for a century or two; if they do not improve it to the good of architecture, and to their own profit, they will have no one to blame but themselves. They have in their hands at present the key to the whole position. Their train-

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ing gives an advantage for dealing with practical wants which only negligence can forfeit, and the prevailing interest in art as a thing desired but not understood gives them a prestige on that side. It is true that there are difficulties in the way, that the supremacy of the trained architect is not to be maintained altogether without question. Among the uninstructed there is a natural tendency to believe that in art, as in politics, one man is as good as another; but people of this belief are open to conviction on the material side; and when the trained architect proves, as his training entitles him to prove, that he is better qualified than the "practical man" to deal with the problems of natural wants and material adaptations, confidence in his other attributes will follow readily. The architect can by virtue of his training, if he does his profession justice, build a house or other building better suited for its uses, more economical, more convenient, more securely and practically constructed, more comfortable, than any one else can build. If he cannot do this, and make it come to be confessed that he can do it, it is his own fault, and not the fault of his profession or his opportunities. Huxleys, Bentincks, Becketts, and Ruskins, to the contrary notwithstanding, it is his business to give compelling proof of this; and the able men who do give proof of it are not few, but many.

As a matter of fact architects have done a good deal, more perhaps than is credited to them, in inventing and adapting not only decorative but useful forms for our present building wants. All the changes in the planning of our dwelling-houses for city or country, which a generation has developed, are the work of architects, and mainly of that part of the profession which would most incur Prof. Huxley's distrust, namely, the men who have done the best work artistically also, and not by the men to whom a practical tendency or experience is ascribed. In the cities where, as in New York and Philadelphia, the planning of dwellings has been mainly in the hands of builders or of architects fledged from builders, the old stereotyped plans of a generation ago have been handed down, and in convenience as well as in elegance of arrangement the houses have lagged behind those of cities where architects have had more "swing." This is true not only of the distribution of plan, but of a hundred devices in the construction of houses and other buildings, by which they are made more comfortable, serviceable, and attractive, apart from their strictly architectural merits. It is greatly owing to this fact, partly recognized and partly unrecognized, that the employment of architects has become the rule, so that nowadays very few houses or other buildings of any importance are built anywhere in the country without the aid of some one who professes to be an architect. Architects in the United States at least not only need to be practical, but are so; and they have really accomplished pretty much all that has been accomplished — the technical improvement of the trades excepted, though of this a great deal is actually due to their influence — in improving the building of their country.

There is of course another side to the question. One meets here and there the notion, which seems to have a greater hold in England, that architects are an impracticable set; that they are negligent of, or do not understand, the arrangement and construction of their buildings, but spend all their effort and waste their clients' money in the adornment of them. There is the more unmanageable difficulty of the tendency to employ uneducated architects and quacks, and to expect to pay quack fees for architectural services. For the first of these notions there has been some foundation in the pretensions of a good many practitioners, especially in the days when the profession was becoming popular, who, finding that there was no fence about it to keep out anybody who chose to straggle into it, and coming in without any training for it, managed to discredit their brothers by doing a good deal of work in a very shiftless way. The second difficulty is one which besets all professions alike, and if architects suffer more from it than lawyers or physicians, it is that their profession is newer and less definitely organized than theirs, — partly too, that there being many things in an architect's work of which the client is a very capable judge, it is not unnatural that he should think himself a qualified judge of the whole, and so disparage the safeguard of professional standing. But since the architect has it in his power, if he will, to distance the merely "practical" men in the things in which alone they can acquire confidence, he has little reason to waste complaints on this trouble.

If therefore the position of our profession is in a degree undetermined, it is for us to determine it. There is no great danger that we shall fail to study the wants of the public. It will remind us in some unmistakable way if we neglect them. But as yet the public has not learned where to take us. It will not be likely to set any higher valuation on us than we set on ourselves. It may find us indispensable, but it will not give us any greater respect than is necessary. In the late debates in the New York Senate, on the appointment of an architect for the city of New York with the provision that he should have the approval of the Institute or its Chapter in that city, one senator said he should as soon think of consulting the Royal Society of Lollipops — whatever that may be; another said that so far as he could see, architects were always quarrelling, which, if it were true, would certainly be reason enough for not consulting them. A correspondent complained in our last number of some of the ways in which architects disparage their profession. It is the misfortune of that profession that its prizes, instead of being the accumulations of steady labor, come at intervals, and in such form as to be great temptations to our cupidity. Consequently we are tempted to waste time, money, and labor on the slender chance of a considerable prize now and then, — to gamble, that is. The public see this, and we cannot wonder that they take advantage of it. Until the members of the profession show that they set some value on their own work, it is useless to hope that it will be rated high by others, even if it is thought to be necessary. Until the public sees that architects agree in the matters which they put forward as essential, and that they are not willing to throw away their work, it will confine its faith to the individuals who may secure its favor; whatever it may offer to the profession at large will be at a very low rate, and betoken very little respect. It is in the power of a moderate number of successful architects at any time to raise the standard of professional competition to a position of reasonable dignity. But as a profession, people will not trust us if we disagree, nor respect us if we come begging to them. There is no reason to doubt that in due time the profession will find its level in public confidence with others that are better established; but we may hasten or retard this consummation greatly by our direct efforts.

STUDIES OF INTERIOR DECORATION.

V.

Our present concern is to indicate the methods by which we are to form a consistent theory or ideal of interior decoration in any given case. We desire to prove that except by a happy accident, no such decoration can be good and fitting unless it is based upon an ideal, and that this ideal is not a caprice or a fashion, or a *parti pris*, but a deliberate development by analytical process of the peculiar capacity of the subject for decorative treatment, or rather for *completion* in the sense of exactly fulfilling all that can be required of it as regards both use and sentiment. We do not propose to be dogmatic as to the language with which this ideal is to be expressed. It may be set forth in poetry or prose, with dignity or playfulness, with circumstance and splendor or with simplicity and reserve, with many words or with few. The expression must be left to the inspiration or opportunity of the designer; but he owes it to the dignity of architecture, of which such decoration or completion is an essential part, that he shall have an idea before he speaks.

Now it is an important fact that in all probability, no two rooms ever existed exactly similar in all their requirements, conditions, and capacities. If they do not differ in respect to size, shape, relative proportions, construction, material, or usage, they will present some other feature of individuality, whether in the disposition of doors, windows, or chimney, in outlook or aspect, or in some contrast or relation to be observed with adjoining rooms.

This phenomenon implies that the ideal treatment in each case cannot be ascertained without close observation and a very nice appreciation of the conditions. It is rarely to be reached by inspiration, intuition, or instinct. This ideal when formed is a positive result, and must differ essentially from the ideal of any other room whatsoever; but each ideal in itself, as we have seen, is capable of innumerable expressions. The theme being thus defined, the designer, in the interpretation of it, is left in that condition of perfect freedom under which alone art is possible. Hence the charm of infinite variety and the delight of constant surprise.

Let us attempt to define by another familiar example the difference between the formation and the expression of an ideal in decoration.

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In Plate IV. we present plans of the two principal stories of a city house facing the north, and having the following distribution of rooms: —

1, porch; 2, vestibule, 8′ x 8′; 3, entrance hall, 8′ x 18′; 4, staircase hall; 5, service stairs; 6, butler's pantry; 7, drawing-room, 16′ x 38′; 8, dining-room, 16′ x 22′; 9, chambers; 10, dressing-rooms and cabinets; 11, bath-room; 12, wardrobes and closets; 13, area for air and light.

The entrance and staircase halls are continuous, and form a corridor eight feet wide and thirty feet long. The principal story is twelve and a half feet high. The staircase hall expands in the second story around a well admitting the light from above into the rear of the first story halls. The rear of the drawing-room is lighted by a skylight through a well which supplies the inner rooms above with light and air.

The halls and the drawing-room are so closely connected that we shall find it most convenient to consider them together. They all have an excess of length over width, and the first *motif* of our scheme of decoration must evidently be to correct this disproportion. This result can only be obtained by dividing the longer dimension. The chimney-breast of the drawing-room is in the centre of one of the long sides. The ideal position for the main door of this room is the centre of the opposite side, so that to one entering the apartment, its disproportionate length may appear divided in halves, and either end of it may be equally accessible. This arrangement moreover facilitates the establishment of a transverse bay across the room from chimney-piece to doorway, and thence continuously across the entrance hall. The transverse feature thus obtained should be made as important as possible, so that by drawing attention to one dimension, we may counteract the undue predominance of the other. The chimney-piece, the natural point of interest in the drawing-room, forms one end of this transverse bay; the other end in the hall should have a piece of furniture appropriate to the position, and important enough to balance the chimney-piece. These two features should have mirrors to increase the apparent transverse length as much as possible; and that these mirrors may have their due effect one upon the other, the doorway should be as wide as the bay and especially high.

As regards the hall however, this transverse bay, in whatever manner it may be expressed, seems somewhat arbitrary until we shall have established other transverse bays there. The conditions are such that we can divide the hall into four such bays, thereby distinguishing the entrance hall from the staircase hall by an architectural treatment, and dividing the inordinate length into parts which have their *raison d'être* in the natural dispositions of the plan. The entrance hall should be so treated as to color that it may form a proper vestibule and preparation for the drawing-room, which, we are to assume, is to be made elegant, bright, and attractive, without affectations of any kind whether of color or form. In approaching such a room, the eye should be occupied by sober and quiet effects of color in order to increase the surprise of the contrast. But the hall is too closely associated with the drawing-room not to be treated as richly as is consistent with these qualities of soberness. This supplies us with another method by which this hall is to be distinguished from the staircase hall; for, as a treatment of such sober elegance as we propose would become vulgar and redundant if continued along the staircase hall and thence up into the second story, we must needs establish a distinct line of demarcation, against which the peculiar wall treatment of the entrance hall may stop and that of the staircase hall may begin. This is obtained by pilasters of wood supporting a beam on a line with the well of the stairs, thus indicating the manner of expressing all the transverse bays of the entrance hall; but the beam forming the division between the two halls, as it has an especial function, should receive an especial treatment.

The contrast of color treatment between the two halls should be different in its character from that between the entrance-hall and drawing-room. As the line of demarcation between these two halls is somewhat arbitrary, we should use every means to make it as sharp and distinct as is consistent with harmony. As the staircase hall serves as a vestibule to various chambers, each of which, to be properly completed, must take upon itself a certain individuality of color, its walls should be cool in tone, very quiet, very neutral, and light enough to reflect well. Those of the entrance hall on the contrary, as it borrows a sufficiency of light, should be dark, rich, detailed, and absorbent. Both halls should have a high panelled wainscot to protect the walls from injury; and to assist in correcting its inordinate height, the walls of the entrance hall may be treated with a screen and frieze, respectively dark and light.

The parlor chimney-piece with its mirror is balanced by the mirror and hall-table at the other end of the principal transverse bay. The material of which these two pieces of furniture are constructed should be the same in order that their necessary relationship may be more distinctly defined. This seems to require the use of the same wood in halls and drawing-room. We choose black walnut, polished light with shellac or wax, and rubbed down to a dead finish, as equally suitable in both places. A lighter wood would not be so rich and warm, and would not combine so effectually with the light, warm, and reflecting tones which we find desirable in the drawing-room, or with the dark treatment of the walls outside.

The pilasters in the hall being of wood, it becomes necessary to treat the transverse beams with the same material; and as the passage is naturally too high for its width, we can afford to give great depth to these beams, framing in the panels thus formed in the ceiling with a wooden cornice of bold projection separated from the ceiling by a space of three or four inches, thus creating a shadow around the panels or caissons, and contributing materially to the effect of weight and to the depth of color which it is necessary to realize in this place.

We have thus, by considering the local conditions, worked out an ideal of decoration for the two halls. We have discovered that the leading *motif* is to decrease their excess of length by giving to each a different treatment, the entrance hall being distinguished by transverse bays and a deeper color, and separated from the staircase hall by an emphatic line of demarcation. We have also to decrease the excess of height by deep beams and a frieze; and both halls are to have a high panelled wainscot of black walnut.

In Plate IV., fig. 3, we present one expression of which this ideal is capable. In this sketch the line of demarcation between the two halls is treated as an open screen, the details of which are defined as dark against light to one entering the house. The principal element of this screen is its open frieze consisting of a row of stunted columns which are repeated from the corbelled columns supporting the ends of the transverse beams. The frieze thus emphasized in the lines of construction is indicated on the wall-surface in salmon color decorated with figures in red and green. The screen below is in Pompeian red with border lines of black and buff.

The panels of the ceiling bear the lighter tones of the walnut beams with lines of red defining their outline, and enriching the effect. Over the wainscot is a narrow belt of dead black, thus conspicuously placed in order to develop the yellowness of the wood, and by contrast with the other colors to give life and spirit to the composition. The droplight is in brass. The walls of the staircase hall received a treatment of blue-gray with borders made up of shadow belts and narrow lines of soft red.

In fig. 2 is presented a study of one side of the entrance-hall, showing the general expression of the wall-treatment; also exhibiting the mirror and hall table which mark one end of the main transverse bay, and balance the mirror and chimney-piece which constitute the drawing-room end of the same bay.

We shall next attempt the development of a consistent theory for the completion of the drawing-room as shown in this plan.

H. V. B.

THE ILLUSTRATIONS.

MORELAND-STREET CONGREGATIONAL CHURCH, BOSTON, MASS. J. H. BESARICK, ARCHITECT.

(32 Pemberton Square, Boston, Mass.)

THIS church and chapel were erected in 1876. The walls are built of Roxbury stone, with yellow sandstone belts, etc. The inside finish is of ash. It has an open-timbered roof. It will seat eight hundred persons, and when the chapel is added to it, which can be done by opening large sliding-doors, it will seat eleven hundred. It cost $50,000.

INTERIOR DECORATION. — IV.

See preceding article.

PROPOSED CHÂTEAU ST. LOUIS, QUEBEC, CAN. W. H. LYNN, ARCHITECT.

See succeeding article.

PROPOSED QUEBEC IMPROVEMENTS.

QUEBEC is Canada's ancient capital. It was the capital as well as the starting-point of Nouvelle France. To all Canadians, at least, its picturesque scenery and historic renown make it powerfully attractive. New England too has points of contact with this city through some of the most stirring episodes in her colonial history. And Quebec is one of the few cities in Canada in whose history memorable deeds are not few nor isolated, — deeds bearing with them such names as Jacques Cartier, Roberval, Champlain, Frontenac, Montcalm, Wolfe, Montgomery, and Arnold.

A glimpse of these things, in passing, is all that concerns us. What we desire to note is that in the autumn of 1875, the Earl of Dufferin, then and now Governor-General of Canada, developed a scheme for the improvement of the city of Quebec without interfering unduly with the ancient fortifications. This scheme contemplated, —

1. A prolongation of streets through the walls.
2. An enlargement of the Esplanade, together with the formation of ornamental grounds outside the walls, and connected with the Esplanade by sallyport.
3. A continuous line of promenade along the walls and outside the Citadel.
4. A new Château St. Louis to be erected in the Citadel.
5. *Tourelle* additions to present walls at various points.

On his Excellency's submission of the scheme, the City Council

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of Quebec expressed themselves highly pleased with it, and immediately voted $30,000, which the Provincial Legislature of Quebec supplemented by $93,500; and the aggregate of these was thought ample for the construction of gates and thoroughfares, the citizens hoping that the Dominion Government would find the necessary funds to build the new Château St. Louis, considering its intended use as an occasional vice-royal residence.

From the fact that the sketches we publish are rough copies of the entire series of Mr. Lynn's pencil-sketches (save only a plan), it seems natural to suppose that in executing the working-drawings these will only be taken as suggestive.

As being somewhat explanatory, as well as its giving us the opinion of a gifted art amateur, we make an extract from the published speech of H. E. the Earl of Dufferin, delivered at a banquet tendered him by the Mayor and City Council of Quebec, on 21st June, 1876: —

"I can assure you it has been with the greatest pleasure that I have learned that there is now every prospect of our being able to carry to a successful conclusion the scheme which has been set on foot for the restoration and for the embellishment of the ancient city of Quebec, — a scheme which combines a due regard for the growing exigencies of your increasing traffic, by the widening of your thoroughfares, and the multiplication of your modes of exit and entry. In doing this you are, after all, doing that which has been done by every municipality in Europe which has had the good fortune to find itself placed in similar circumstances, and who are wakening up to the desirability of preserving with pious care the memorials of the past. But if this duty is imperative on the other side of the Atlantic, how much more incumbent is it on us to maintain the only city upon this continent which has preserved the characteristics of its early days, — a city whose picturesque architecture and whose noble battlements present a spectacle the like of which is not to be found between Cape Horn and the North Pole! For, Mr. Mayor and gentlemen of the Town Council, let me remind you that you do not hold Quebec merely for yourselves, you do not even hold it in the interests of the people of Canada; but you are the trustees of Quebec on behalf of civilization, and all the inhabitants of this continent. Who but would regret the ruin and degradation of its walls as an irreparable outrage and as a common and universal loss? But happily there is no danger of any such devastation being perpetrated. Far from laying a suicidal hand on those rivals of time, you are preparing to repair, to guard, and to adorn them; and sure am I that in future ages, when a maturer civilization shall have transformed Canada into what it is not possible to imagine or conceive, a grateful posterity will hold in veneration these wise ediles who have preserved intact the sacred memorials of their country's history, — memorials which the passing century will invest with an ever-deepening glory of interest and splendor. For, Mr. Mayor, that which you are engaged on here is observed by our fellow-countrymen at home. No sooner was it known in England, that the citizens of Quebec were about to repair their fortifications, than the Secretary of State for War, as the spokesman and representative of the empire, wrote to inform me that he intended to express his own admiration, and the admiration of the soldiers of England, with what was being done here, and was going to the British House of Commons and asking them — and they would receive the proposal with the most enthusiastic acclamation — to vote a sum of money to be expended in the decoration of whatever point along your walls might best connect itself with the memory of those illustrious heroes, Wolfe and Montcalm, whose deeds of valor, and whose noble deaths in the service of their respective countries, have brought lustre upon the respective nations for which they contended, and whose outworks they watered with their blood.

"But, Mr. Mayor and gentlemen, the news of what you are about to do touched the heart of even a more august personage than the Secretary of State for War, — the Queen of England herself. No sooner had she learned what was undertaken, — she who takes as deep an interest in every thing that passes in her remotest colonies as she does in what happens within a stone's-throw of her palace, — than she told me to convey to you, Mr. Mayor, at an early opportunity — and what better opportunity could I take than the present? — her warmest sympathy, and her entire approbation and approval of what you have undertaken. And she further has commanded me to inform you that it is her intention to present your good city of Quebec with one of the new gateways with which your city is to be repaired [enthusiastic applause], in order that she may be personally associated with you, and with your colleagues, and with the city of Quebec, whose liberality and patriotism have induced you to engage in this work. And she further desires that the gateway in question be connected with the name of her illustrious father, the late Duke of Kent, who retained up to his dying day so grateful a recollection of the kindness and the courtesy he had received at the hands of its inhabitants. But, Mr. Mayor, this would not be a proper occasion for me to go into any of the details in connection with the work. I have the greatest confidence in the good taste, in the discretion, and in the architectural skill, of those with whom the decision of these points must ultimately rest. There is one leading idea however which I trust will be kept in prominence, and which in my opinion ought to direct and determine all the subordinate arrangements; and that is the construction of a continuous pathway for pedestrians, beginning at Durham Terrace, and running around the foot of the Citadel, next by the Esplanade, the Artillery Barracks, Palace Gate, and so behind the present Parliament Building, across the street, and back again by Durham Terrace. If you succeed in creating such a pathway as I have described, you will then have that which will not be paralleled either for commodiousness, for the innumerable points of view which will be commanded by it, or for safety and tranquillity, in any capital in Europe. And, Mr. Mayor, I must also congratulate you upon the fact that you have at your disposal a quarry of smooth and well-cut stone in those various unnecessary outworks which are to be found beyond the *enciente* of your city. This will be found amply sufficient both to repair the dilapidated portions of your bastions and as materials for the projected gateways. But I trust you will pardon me if I venture to convey to you a word of warning. I trust that in making use of these materials you will not fall into the mistake which was made by a friend of mine in Ireland.

"The nobleman to whom I refer had a castle, which in ruder times had been the residence of his family, but had now become a ruin. Observing from day to day that it was subject to various depredations from mischievous boys, and cattle and donkeys, he instructed his agent to protect it with a wall; and having given these orders, he went to England. On his return he went to ascertain the result of his orders. The agent assured him that his commands had been properly carried out; but what was his dismay upon arriving at the site of his castle, to find indeed a beautiful, broad new wall, but the castle itself levelled with the ground! the agent having pulled down the castle in order to use the materials for the wall."

THE CLOCK OF BEAUVAIS CATHEDRAL.

JUST before the Franco-Prussian war M. Vérité, a well-known French engineer, completed for the cathedral of Beauvais one of those complicated clocks such as form for the common sight-seer the chiefest attraction of Strasbourg, Lubeck, and Lyons. In accuracy of performance this clock, one of the most wonderful pieces of mechanism that the present century has produced, is expected to surpass any of its prototypes. What the history of its undertaking was, or how long it took to construct it, the *Builder* does not tell us; but that it took both time and money may be taken for granted, in view of the intricate calculations that must have been made — for all the wheels and pinions must be in exact geometrical proportion to each other — in order to lay out the work for the score or more of different classes of artists and artisans who were needed to make the seventeen hundred different pieces of which the clock is composed.

The clock at Beauvais, unlike the Strasbourg clock, is in a single and self-contained structure, a tower sixteen feet broad, nine feet deep, and forty feet high, made of walnut wood. The principal façade is in the Romanesque style, and its chief feature is an arcade of three bays surmounted by the great dial about five feet in diameter, which takes the place of a rose window. The mouldings used are characteristic of the style, and all the woodwork is richly sculptured, the tympana and niches being filled with allegorical representations of the world, time, the four ages of man, the seven deadly sins and the like number of cardinal virtues, angels, devils, and figures emblematic of the hours and seasons, and above all the Saviour. Among its scenic attractions, which, even if it prove untrustworthy as an accurate horological instrument, will always make it an object of interest, is a cock which just before each hour flaps his wings and crows; while at the striking of the hour the various figures start into action, and go through their allotted motions. The façades are ornamented with gold and color so as to produce an effect at once grand and gorgeous. The clock itself has forty-nine dials of different sizes, each devoted to chronicling a different series of temporal or astronomical events.

The motorial system consists of one principal and fourteen secondary motors with their respective clock-trains. The chief motor communicates movement to hands that indicate time on more than twenty different dials, — to the sun and moon on the solar and lunar dials; to the hands that mark sidereal time; to two planispheres, or projections of the celestial sphere on the plane surface of the dials; to the rotating dial that shows the eclipses of the sun; to the hands of the repeating dial on the reverse face of the clock; and to the hand of the seconds dial.

The Beauvais clock is more completely a mere clock than is the one at Strasbourg, which is at once a clock and an orrery, and aims at indicating such impossibilities as the precession of the equinoxes, which accomplish their revolutions in periods of 25,920 years. Yet many of the dials upon the Beauvais clock are devoted to indicating such of the planetary movements as may from their comparative simplicity and limited periodicity come within the scope of the astronomer accurately to determine, and the power of the mechanician to visibly interpret. On the main dial is shown the ordinary division of the day into hours and minutes, the circumference being divided into two halves of twelve divisions each. Occupying the central bay of the three immediately below the main dial is a group of eleven dials arranged around a twelfth dial as a

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centre. This central dial has five concentric circles, to the letters or figures on each of which points a separate hand, which indicate the notation of the ecclesiastical computory. Thus the outermost circle marks the twenty-eight years of the solar cycle, at the end of which period the year begins upon the same day. The second circle shows the dominical or Sunday letter for each of the twenty-eight years. The third circle shows the golden number that marks the lunar cycle of nineteen years, at the end of which period the new and full moon coincide. The fourth circle shows the day of the epact or number of eleven days that are added to the lunar year to make it correspond with the solar year: as once in three years the number of epact days exceeds twenty-nine, a lunar month must be intercalated, and this makes the lunar and epactic cycles coincide. The fifth circle marks the year of the current indiction, a period of fifteen years, in accordance with which the Roman emperors dated their acts, and, at the present day, the Popes date their briefs and encyclical letters. On the 31st of December the motor governing the movement of this dial acts, and the five hands indicate a fresh set of letters for the new year.

Dial No. 2 of this group marks the hours of the unvarying sidereal day of 23 hours, 56 minutes, and 4 seconds. Dial No. 3 shows the solar equation, or the difference between mean and true time, as measured by two successive transits of the sun's middle across the meridian. Mean and true time coincide on April 15, June 15, Sept. 1, and Dec. 24. Dial No. 4 indicates the declination of the sun to the north or south quarter of the heaven. Dials Nos. 5 and 6 show the lengths of days and nights in the latitude of Beauvais. Dial No. 7 shows the four seasons of the year. Dial No. 8 shows the time of the sun's entry into each sign of the zodiac. Dials Nos. 9 and 10 show the time of sunrise and sunset on each successive day. Dials Nos. 11 and 12 show the day of the week, and the nominative planet of each day.

Dial No. 1 in the left-hand one of the three bays, images the actual phenomena of sunrise and sunset. Besides this there is a group of eight dials arranged around a ninth dial, showing meridian time at Paris and at eight places west of Paris, — London, Amsterdam, Bordeaux, Lisbon, Montreal, New York, Mexico, and Rio Janeiro. Dial No. 3 gives the year, the day of the year and its patron saint, the months and the number of days in each month; it also shows the leap-years, and the secular bissextiles when the century begins with a leap-year. Three minor dials within its circumference show the phases of the moon, its age, and the mean time of its transit over the meridian of Beauvais.

In the right-hand one of the three arcades is a dial imaging the movements of the moon. A group of nine dials shows meridian time at nine places eastward of Paris, — Rome, Berlin, Stockholm, St. Petersburg, Warsaw, Florence, Vienna, Naples, and Lyons. Dial No. 3 represents the calendar of Easter and the feasts depending on it for the next three hundred years. This dial also has within its circumference three lesser dials showing respectively the year of the world according to the Mosaic chronology, the millennial number of the current year, stating whether it is leap-year or not, and the third shows the current century, indicating also the secular bissextiles.

One of the dials on the right-hand lateral face of the clock represents the solar eclipses (lunar eclipses are nowhere indicated). No. 2 shows the rise and fall of the tide at Mont St. Michel on the coast of Brittany. No. 3 shows the northern planisphere on which are represented eighty-six constellations, four thousand stars, and more than five hundred nebulæ, carefully graduated according to their magnitude. This dial with its accessories indicates the aspect of the heavens at each instant of mean time; the rise, course, and setting of each star; the period of a star's presence or absence above the horizon; and the circumpolar stars. Some of the dials on the left-hand lateral face correspond to those just mentioned, and represent, one the southern planisphere with its stars and constellations; another the rise and fall of the tide at the island of Jersey; and another shows the orbital movement of the seven principal planets, Mercury accomplishing its revolution in eighty-eight days, and Saturn its revolution in twenty-nine years.

As we have said, motion is imparted to this intricate system of wheel-work by one principal and fourteen secondary motors, the greater part of whose machinery is made of brass. The pendulum which regulates these forces weighs a hundred and fifteen pounds, and in order to insure its uniformity of action the main rod is composed of five rods of steel and four rods of copper. The bob could not be attached to this main rod in the usual way, as the space needed was occupied by an apparatus called the *remontoir d'égalité*, invented by M. Vérité, which regulates with the utmost exactitude the constancy of force and regularity of action of the whole system. In order therefore to attach the bob to the main rod, it is grasped at the two extremities of its horizontal diameter by steel rods inserted in cylinders of copper, which have their lower extremities resting upon cross-bars attached transversely to the upper system of compensation, leaving the bob and the rod distinct unities, and determining the length of the pendulum and consequently the arc of its vibration, with the nicest mathematical accuracy against all variations of temperature.

The motion of the clock is kept up during the process of winding by what is known to English clock-makers as Harrison's going-barrel.

The cost of the clock was about $500,000, of which about $17,500 were needed to complete the case. All the money was raised by subscriptions.

THE DRAINAGE OF COUNTRY HOUSES.

NEWPORT, R.I., March 26, 1877.

EDITOR AMERICAN ARCHITECT AND BUILDING NEWS.

I trust that your readers are not tiring of this discussion, for — unlike Mr. Bayles — I think it quite as appropriate, even in its agricultural details, to an architect's as to a farmer's paper. The question as to the action of the soil, and of the air which it contains, upon organic impurities added to it, is equally important whether we are considering the effect of this action in preparing food for plants, or in removing conditions dangerous to health. It has its sanitary side, and so claims the attention of the architect, — the practical sanitarian.

It is to be understood that what I propose is not a "soakage" system, but something that stops so far short of saturation that in an extreme case, as per my communication on p. 55, only about one volume of liquid is added, per day, to over three hundred volumes of earth. The importance attaching to the soil as an agent of disinfection is due to its known powers of absorption and to the oxidizing effect of its contained air. "Satisfactory evidence of the fact that oxygen is concentrated in the soil" is to be found in the recorded testimony of many investigators in the field of agricultural physics. Prof. Johnson, of New Haven says,[1] "The soil being eminently porous condenses oxygen. Blumtritt and Reichardt indeed found no considerable amount of condensed oxygen in most of the soils and substances they examined; but the experiments of Stenhouse and the well-known deodorizing effects of the soil upon fæcal matters leave no doubt as to the fact. The condensed oxygen must usually expend itself in chemical action. Its proportion would appear not to be large; but being replaced as rapidly as it enters into combination, the total quantity absorbed may be considerable. Organic matters and lower oxides are thereby oxidized. Carbon is converted into carbonic acid, hydrogen into water, protoxide of iron into peroxide. The upper portions of the soil are constantly suffering change by the action of free oxygen, *so long as any oxidable matters exist in them.*" Schubler says,[2] "The earths possess the remarkable property of absorbing oxygen gas from the atmospheric air, a phenomenon pointed out many years ago by A. von Humboldt. . . . This property of the earths is confirmed almost without an exception, provided they be employed for this purpose in a moist state." In the experiments which he instituted, exposing one thousand grains of different earths for thirty days in vessels of fifteen inches cubic contents (15 inches of air containing 3.15 inches of oxygen) he found that sandy loam absorbed 1.39 inches of the oxygen, clay loam absorbed 1.65 inches, and garden mould absorbed 2.60 inches. This looks very like concentration. All authorities agree in ascribing this power of condensing oxygen (and other gases) to all materials very much in proportion to their porosity. As charcoal is very porous, this is usually taken as an illustration. Voelcker says,[3] "It [charcoal] possesses the power, not only of absorbing certain smelling gases, sulphuretted hydrogen and ammonia, but also of destroying the gases thus absorbed; for otherwise its purifying action would soon be greatly impaired. It is very porous, and its pores are filled with *condensed* oxygen to the extent of eight times its bulk. We have therefore in charcoal oxygen gas (which supports combustion or lights fires) in a condensed or more active condition than in the common air which we breathe. Hence it is that organic matter in contact with charcoal is so rapidly destroyed. The beauty of charcoal is that the destruction takes place imperceptibly, and that its power of burning organic matter is continually renewed by the surrounding atmosphere, so that it is a constant carrier of atmospheric oxygen in a condensed state in its pores. The oxygen that acts on organic matter and burns it up is speedily replaced, and the process goes on continually. Hence it is that a comparatively small quantity of wood or peat charcoal is capable of destroying a very large quantity of organic matter." Johnson, after describing and illustrating this action of porous substances, says,[4] "The soil absorbs putrid and other disagreeable effluvia, and undoubtedly oxidizes them like charcoal, though perhaps with less energy than the last-named substance, as would be anticipated from its inferior porosity." Jamieson says,[5] "All porous bodies which offer a considerable surface to gases act like charcoal." Saussure says that charcoal absorbs nine and a quarter times its bulk of oxygen. Prof. Way says,[6] "The reason that the sand accelerates the fermentation of the urine is no doubt this: all bodies possess a surface attraction for gases, and of course therefore for common air. This attraction, *which enables them to condense a certain quantity of air on their surfaces*, is in direct relation to those surfaces." Way filtered sewer-water through six inches of soil. In two and a half hours he collected half a gallon which he analyzed. It contained no potash, "no ammonia or nitrogen in any form:" the original liquid contained over three hundred grains to the gallon of

[1] How Crops Feed, p. 218. [2] Journal Royal Agricultural Society, vol. i. p. 197.
[3] Latham's Sanitary Engineering, p. 236. [4] How Crops Feed, pp. 170, 171.
[5] Journal Royal Agricultural Society, vol. xvii. p. 448.
[6] Journal Royal Agricultural Society, vol. xi. p. 366 *et infra*.

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"organic matter and salts of ammonia." He found the *absorption* to extend to a weight of sewage-water *more than equal to the weight of the soil.* This, be it remembered, was an instantaneous mixture, with no opportunity for a constantly renewed oxidizing action.

That the soil absorbs the products of the decomposition of organic matter, and carries the decomposition to completeness, no chemist would question. This action is the basis of the efficiency of the earth-closet. In my own experiment, an analysis of the earth and ashes used in earth-closets for six years (probably ten times over) showed that practically all of the eight hundred pounds of solid dry matter estimated to have been deposited during the six years was destroyed by oxidation as completely as it would have been by actual burning in a furnace.

The investigations of Way and Thompson fully determine the *retention* of impurities by the soil, — an action which they ascribe largely to the double silicates.

The porous condition of the soil does *not* favor the escape of gases. On the contrary, in the case of the earth-closet, dry and porous earth completely arrests the escape of gases, as is demonstrated by the absence of smell, and by the absence of chemical reaction. If the quantity of decomposing matter is large and concentrated, gas may be formed in such volume as to force its way through, but *exhalation* does not not occur. It is not claimed that the gases which are most productive of disease are appropriated by vegetation, but that they are destroyed by chemical action, — by oxidation.

The report of Dr. Mouat, on the effect of the use of the earth-closet in the government institutions of India in time of cholera, is conclusive, at least so far as this disease is concerned. [1] All recorded evidence as to the use of the earth-closet in stopping the spread of disease is to the same effect.

I believe that I only "seem" to contradict myself. Loose soils are more freely permeated by atmospheric air, and heavy clays are more retentive of organic impurities presented in solution. The air in the loose soil oxidizes, and the double silicates in the clay have other chemical action. There is air in all soils sufficient to care for the small amount of impurities discharged by a single household throughout the mass underlying twenty-five hundred feet of surface; and there is clay enough to have an important effect even in what is called sandy loam.

The absorptive powers of clay are manifest to chemical tests even when solid lumps of it are penetrated by solutions of nitrogenous matter. I think my statement that "organic matter once seized upon by the soil is never again given up in an unchanged condition," is the statement of an established fact — with the limitation that after the soil is *saturated*, it cannot "seize upon" new supplies until the first supply has become chemically changed. On the Mapes Farm in New Jersey, — where, by the way, I was a pupil in 1853, — the manure was *ploughed* down, and the deposition of organic matter in the subsoil was mainly due to the decomposition of the roots of crops which (like clover) have the power of deep penetration. In the clay subsoil of the richest and oldest garden we find no evidence that organic matter has ever "worked down" into it; on the contrary, we know that, as "organic" matter, it does not do so even in pure sand or gravel.

Of course "there is a limit to the absorptive powers of every thing," — a limit to every thing, in fact, — but that limit in the soil is, in my opinion, far beyond the needs of the case in hand. So, too, the "some extent" of the renewal of absorptive power is more than enough for the purpose. I believe that wells are polluted by filth flowing through porous strata and rock-fissures, not by filth that has once been fairly *absorbed* by the soil.

The quotation from Lissauer applies to *excessive flooding*, not to the limited discharge of sub-irrigation drains. Paragraph (1) seems not opposed to my theory; (2) applies obviously to much greater flooding than is contemplated, as the effluent water at Merthyr Tydvil (less than one-tenth as much land — loose and gravelly at that — as I have recommended being used per head) remains pure after the filter-bed has been used for several years. (3) All soils can be irrigated (with sewage?), but heavy soils may not be so profitably irrigated because they part with their water so largely by evaporation, and thus lose heat. (4) We do not propose to tax the one-hundredth part of the "maximum power of absorption." (5) The limitation of our volume makes this inapplicable to the discussion. Of course the system of sub-irrigation has its limitations, but it is a vast step ahead of any cesspool system.

If the experience of the world is of any value, it is proven that the tight cesspool, which Mr. Bayles advocates, conserves filth under the conditions which are the *most* "favorable to the exercise of its power for mischief." Even eternal vigilance will not stop the putrefaction of its contents. With some experience and observation in such matters, I do not hesitate to express the opinion that the sub-irrigation system may be more nearly left to itself than any other I know about.

In reply to the bashful "Zero" (p. 79) I would say that my "careful watching" and "satisfactory results" have been largely confined to New England, and have compassed much less than a zero temperature. Probably the fact that we occasionally use warm water is precisely the cause of our immunity from obstructions during a frozen condition of the ground. In winter my flush-tank dog-house is packed with litter or leaves which keep out the frost. *How* the water gets away in the frozen ground, I do not know, — probably by thawing the ground. That it does get away, I do know, — 12,000 gallons though it be. I *suppose* that the aëration of the soil while unfrozen continues in sufficient degree for the needed effect while the surface is locked; but this is only offered as a probable supposition, not as a demonstrated fact.

One important feature of Fludder's system was not described. It is a device for nearly closing the inlet in the coldest weather, by a contraction-bar, which in moderate weather opens it to its full size.

I can only answer Mr. Towne's question by repeating the opinion before given, — that the sub-irrigation system is much the simplest, the safest, and the best; and that its cost is really trifling, even where the water from the kitchen sink and laundry trays in the cellar has to be lifted with a pump to the level of the drains. He accepts, apparently without question, the wrongly based objections of Mr. Bayles, and says, "I think it must be conceded that this system cannot be extensively relied on *for use on private grounds*, of small extent, particularly in our Northern States." To offset this, I can point to instances of success on such grounds in such localities, especially to my own, which has worked *perfectly*, winter and summer, for seven years. I have never heard of a case of failure. These examples, supported by the arguments given above, must sustain the claims of the sub-irrigation disposal of liquid house wastes, or those claims cannot be sustained by my advocacy.

Since writing the above I have found in an editorial of the *Agricultural Gazette* (London), of March 19, the following: —

"The astonishing power of an aërated and porous soil and subsoil (our knowledge of which we owe to Dr. Frankland) may be trusted a great deal more than engineers appear to trust it. Mr. Norman Bazalgette labored hard the other evening to prove that Merthyr filter-beds had done nothing like the work which Dr. Frankland had declared them capable of doing. But the answer to his criticism, which was given in the subsequent discussion, seemed to us complete; and as upon it rests the safety of the cheaper method which in the agricultural interest we recommend, we reproduce it here.

"At the close of his clear and conclusive argument on this subject, Dr. Frankland put the matter thus: 'I have analyzed the effluent water from the Merthyr filter-beds when only 230 people drained on to them per acre, and again when 500 and when 1,250 people were draining on to them per acre; and deducting and discounting the dilution by the subsoil water; in the first case it was thirty times as clean and as pure as it needed to be; in the second case it was purified seventeen times more than enough, and in the last case it was still three or four times purer than was necessary. Is it unreasonable then to believe that those filter-beds could have cleansed sufficiently or even more than enough the sewage of three or four times as many as the greatest of these numbers, if only the work had been given them to do?'

"Now we contend that the work was given them to do, and that they did it." Then follows an explanation of the irregular distribution of the sewage over different parts of the ground, showing that although each area of about one acre received its due proportion of sewage, "the quarter of the plat which was next to the carrier had its full work to do from the first and till the last of its six hours' period; but it often was not till two or three hours had elapsed that the quarter farthest from the feeder was even fairly wetted. And thus it was that while it may be true enough that it was only the sewage of 20,000 people that was dealt with by the twenty acres of filter-bed at Troedyrhiew, — being at the rate of 1,000 people per acre, — yet at least one-half, probably much more than one-half, of that beautifully purified effluent water must have come from areas of the filter-bed which were being watered at the rate of 2,000, 3,000, or 4,000 people per acre."

My recommendation for the use of soil for the purification of household sewage was based on a calculation of only 175 people per acre. It is proper to explain that when Dr. Frankland says that the water was made "thirty times as clean and pure as it needed to be," he means thirty times purer than the Rivers Pollution Commissioner's standard of fair potable water.

Geo. E. Waring, Jun.

[1] Twelfth Report of the Medical Officer of the Privy Council, pp. 104, 105.

THE CHICAGO CUSTOM HOUSE.

Chicago.

Mr. Potter, the late Supervising Architect of the Treasury Department, while taking exceptions to one sentence contained in the Chicago letter of March 3, in his communication of the 13th introduces other matters which make a more detailed statement of facts in relation to the Chicago Custom House necessary. There are very few matters connected with the modifications of this building which have "escaped the notice of your correspondent," but some of them it was not thought worth while to recount. In the opinions of many who are competent to judge of such matters, nothing has been done to those foundations which is of any practical utility. The recommendations of the third commission have already been stated in this correspondence. What was attempted to be done and what has been done has not been stated. After the approval of the report of this commission, which was as stated by

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Mr. Potter in his communication, he issued instructions with illustrative drawings to the superintendent here to excavate the area all around the building below the concrete, and, undermining it for a distance of one foot from the edge, to fill in the space so excavated with concrete. These instructions were never enforced, but were subsequently withdrawn; and after a new superintendent had been appointed, the recommendations of the commission were carried out as stated by Mr Potter in his communication. Any architect or engineer can readily form an opinion as to whether this method of re-enforcing foundations could be of any practical utility or not, and therefore none will be here offered.

With regard to the knowledge of your correspondent as to what measures have been taken to equalize the weights and lighten the walls, it is only necessary to refer back to the Chicago letter of July 15, 1876, for a description of all that was proposed and done, which was given in what was thought to be at the time a complimentary spirit.

It is a principle with this paper, which is endeavored to be adhered to, to abstain from all personal "reflections," directly and impliedly; and there was not the least intention in the sentence quoted to reflect on the judgment of the gentlemen forming the first commission. The fact that the foundations were "terribly berated" at the time is well known, and that by all sorts of persons and newspapers. We cannot think that the inference which occurs to Mr. Potter was shared by many persons.

FOUNDATIONS.

THE CENTRAL PARK, NEW YORK.

3D APRIL, 1877.

TO THE EDITOR OF THE AMERICAN ARCHITECT.

Dear Sir, — Carefully reading the section on the Central Park, of the annual address before the Institute, as printed in your issue of the 24th ult., I cannot help thinking that in effect it pointedly denies to Mr. Vaux his due professional record.

I beg therefore enough of your space to say that no one has more claim than Mr. Vaux to the design of the Park or to what in the address is termed "the æsthetic arrangement of the grounds."

As to its distinctively architectural works, during twelve years he made the original studies for them; and his superintendence of their details was personal, direct, and controlling.

Respectfully yours,

FREDERICK LAW OLMSTED.

E. AND O. E.

INDIANAPOLIS, IND., March, 1877.

EDITOR OF THE ARCHITECT AND BUILDING NEWS.

Dear Sir, — In your very interesting journal you have on several different times published what was meant for G. W. Bunting, architect, Indianapolis; but you have made it Bunling, Buentig & Co. It is not a very pretty name when spelled correctly, but when it is murdered like the above fashion it is unendurable. Please be so good as to write it G. W. Bunting, or leave it out of your paper entirely, and oblige Yours truly,

G. W. BUNTING.

NOTES AND CLIPPINGS.

THE NEW YORK COURT-HOUSE CONTRACTS. — In reference to the opinion given on Friday by the Corporation Counsel to the Board of Apportionment, that the Court-House Commissioners had no authority in law to make contracts amounting to a sum greater than the $100.000 for which that board had authorized bonds to be issued, while they had made contracts amounting to $381,478, Commissioner Blackstone stated recently that when the commission had been organized by the law of 1874, there was an unexpended balance remaining of the former commission's appropriation, of between $400,000 and $500,000. Applications had been made and granted first for $5,000 of this sum to pay for architect's plans, and afterwards for $100,000; of which $50,000 has been paid out for work upon the architect's certificates. The Commissioners consider that they would act within the law in making contracts to the full amount of the unexpended balance.

THE GREAT AUSTRIAN PICTURE. — It is said that the report that Hans Mackart's great picture of the Homage of Venice to Catarina Cornaro was purchased by the Philadelphia Academy of the Fine Arts was incorrect. The majority of the directors have always opposed the purchase for sufficient reasons, although these do not involve any disparagement of the work as splendid in color. It is merely on exhibition at the Academy, which pays a liberal price for the use of it.

A NEW BOOK. — MM. Firmin Didot & Cie. are going to issue shortly a series of engravings under the title of *Restaurations des Monuments Antiques*, from the drawings prepared and sent to Paris annually by the *pensionnaires* of the *Académie des Beaux-Arts* under the name of *Envois de Rome*. These drawings are mainly restorations of classic buildings, and contain different restorations of the Parthenon, the Erectheum, and the temples of Theseus, of Minerva, and other Grecian buildings; and likewise of the Pantheon, Arch of Titus, Colosseum, Tomb of C. Metella, the Trajan Forum, the Trajan Column, the Baths of Diocletian, the temples of Vesta, Mars, Jupiter Stator, Antoninus, Peace, Venus, etc., at Rome; as well as restorations of remains found in Magna Græcia and in Asia Minor.

THE BROOKLYN BRIDGE. — As a matter for convenient reference, we subjoin the following epitome of the principal facts and dimensions of the Brooklyn Bridge: —

Construction commenced Jan. 2, 1870.
Length of river span, 1,595 feet 6 inches.
Length of each land span, 930 feet (1,860 feet).
Length of Brooklyn approach, 971 feet.
Length of New York approach, 1,562 feet 6 inches.
Total length of bridge, 5,989 feet.
Width of bridge, 85 feet.
Number of cables, 4.
Diameter of each cable, 15¼ inches.
Each cable consists of 6,300 parallel (not twisted) steel wires, No. 7 gauge, closely wrapped to a solid cylinder.
Ultimate strength of each cable, 11,200 tons.
Depth of tower foundation below high water, Brooklyn, 45 feet.
Depth of tower foundation below high water, New York, 78 feet.
Size of towers at high-water line, 140 x 59 feet.
Size of towers at roof course, 136 x 53 feet.
Total height of towers above high water, 277 feet.
Clear height of bridge in centre of river span above high water, at 50° Fah., 135 feet.
Height of floor at towers above high water, 119 feet 3 inches.
Grade of roadway, 3½ feet in 100 feet.
Size of anchorages at base, 129 x 119 feet.
Size of anchorages at top, 117 x 104 feet.
Weight of each anchor-plate, 23 tons.
Estimated total cost of bridge, exclusive of land acquisition, $9,000,000.
Estimated cost of land, say, $3 500,000.
Total estimated cost, $12,500,000.

THE CINCINNATI CUSTOM HOUSE. — The non-arrival of granite from Maine has caused some delay in carrying on work on the Cincinnati Custom House.

THE TRAMPS' PARADISE. — While other towns are doing what they can to discountenance tramps, the town of Stamford, Conn., not only opens its hospitable doors to them, but in a more Christian spirit than Mahomet's mountain even proposes to meet the tramps half way, and to this end voted at a recent meeting to erect a wooden building for paupers, to be so constructed that it can be moved from point to point wherever the work of tramps is desirable in breaking stone. This is regarded as cheaper than to move large masses of stone to the neighborhood of a stationary workhouse.

THE MOTT FOUNTAIN. — Twenty-four residents of Eutaw Place, Baltimore, have purchased the large Mott Fountain that stood, during the Centennial, in front of Horticultural Hall. It is thirty-five feet high, has four basins, and throws a central jet of water fifteen feet in air.

ONE OF WREN'S CHURCHES. —All the exterior stonework of the church of St. Mary Aldermary has been cut away to the depth of several inches, and has been replaced by new stone. The tower is at present undergoing the same restoration.

AN ANTI-RESTORATION MOVEMENT. — In pursuance of Mr. Morris's suggestion a society is now being formed for the purpose of preventing the "restoration" of the architectural and historical monuments of England.

THE BURIED CITIES OF CENTRAL ASIA. — The *Athenæum* says an expedition to explore the buried cities of Central Asia is being talked of in Bombay and elsewhere in India. That treasures like those at Mycenæ may be found in the sands of Mongolia is at least possible. If tradition be of any value, — a tradition, too, which has persistently clung to one locality through the lapse of centuries, — the tomb of Ghengiz Khan is yet, with its fabulously rich treasures, to be found (as Col. Prejevalsky was told by the Mongols) to the south of Lake Tabasun Nor. Within the tomb lies a man who seems asleep. Every evening a sheep or a horse is tied near to the spot; and lo! in the morning the animals have been eaten. In three hundred years, say the Mongols, the sleeper will awake, and lead countless hosts of his children to victory and dominion. This old story is said to be circulating more and more widely every year. Then the Mongols say that constantly the drifting sands disclose, here and there, gold and silver treasures, which they have a superstitious dread of touching. The buried cities under the sands of the Gobi are affirmed to be mines of incalculable wealth, guarded by gnomes and fearful spells, while all the deserts around the hidden ruins are peopled by myriads of howling ghosts. The sands of the deserts of Central Asia regularly move and drift from east to west; and even now the eastern borders of deserts are being denuded widely of all soil that can be torn away by the violent winds.

ANCIENT MONUMENTS. — It is a matter of every-day knowledge that in all ages and countries the ruined structures, whether habitations or monuments, of former generations, have been used by their successors as quarry-grounds for their own purposes. One of the most curious instances of this custom is shown by the almost total disappearance of the Druidical monuments of Avebury, England, which a century and a half ago were much more imposing than the well-known ones at Stonehenge. There were two causes which led to the destruction of these megalithic remains. One was that the Sarsen-Sarsen stone, to use a local name, is unsurpassed as a road-making material. The other was that the stones occupied too much space on the ground, an unpardonable offence in the eyes of the Wiltshire farmer. The means employed for removing them were truly archaic. Fires were kept up around the stones until they were highly heated, when cold water was thrown upon them, shivering the stones in fragments of a manageable size.

PETROLEUM *vs.* CANDLES. — Herr Erismann establishes in the *Zeitschrift für Biologie* the fact that petroleum when burned in a lamp of good construction gives off fewer products of imperfect combustion than either gas, rape-oil, or stearine candles; and that stearine candles having the same luminous power vitiate the air most.

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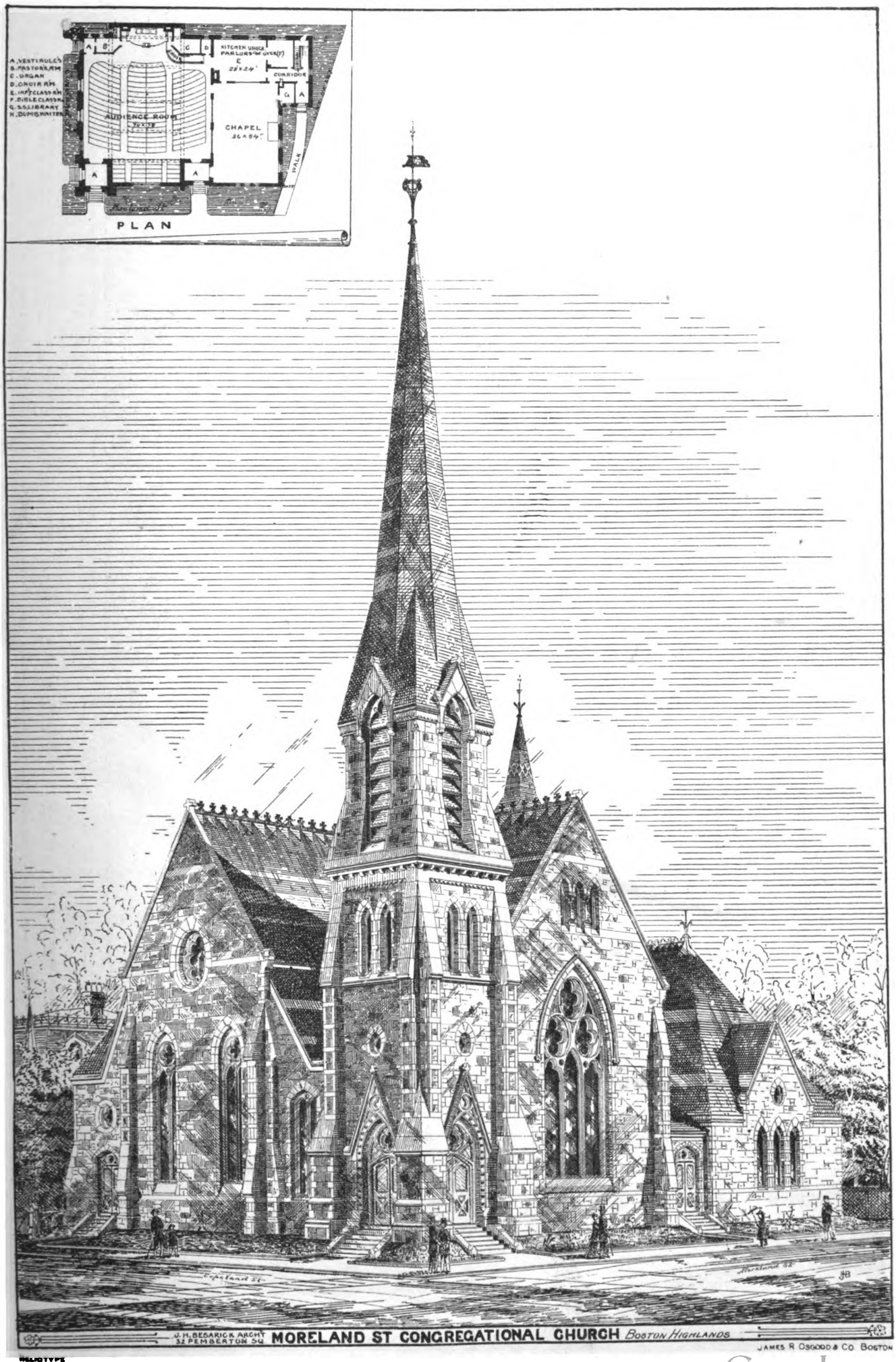

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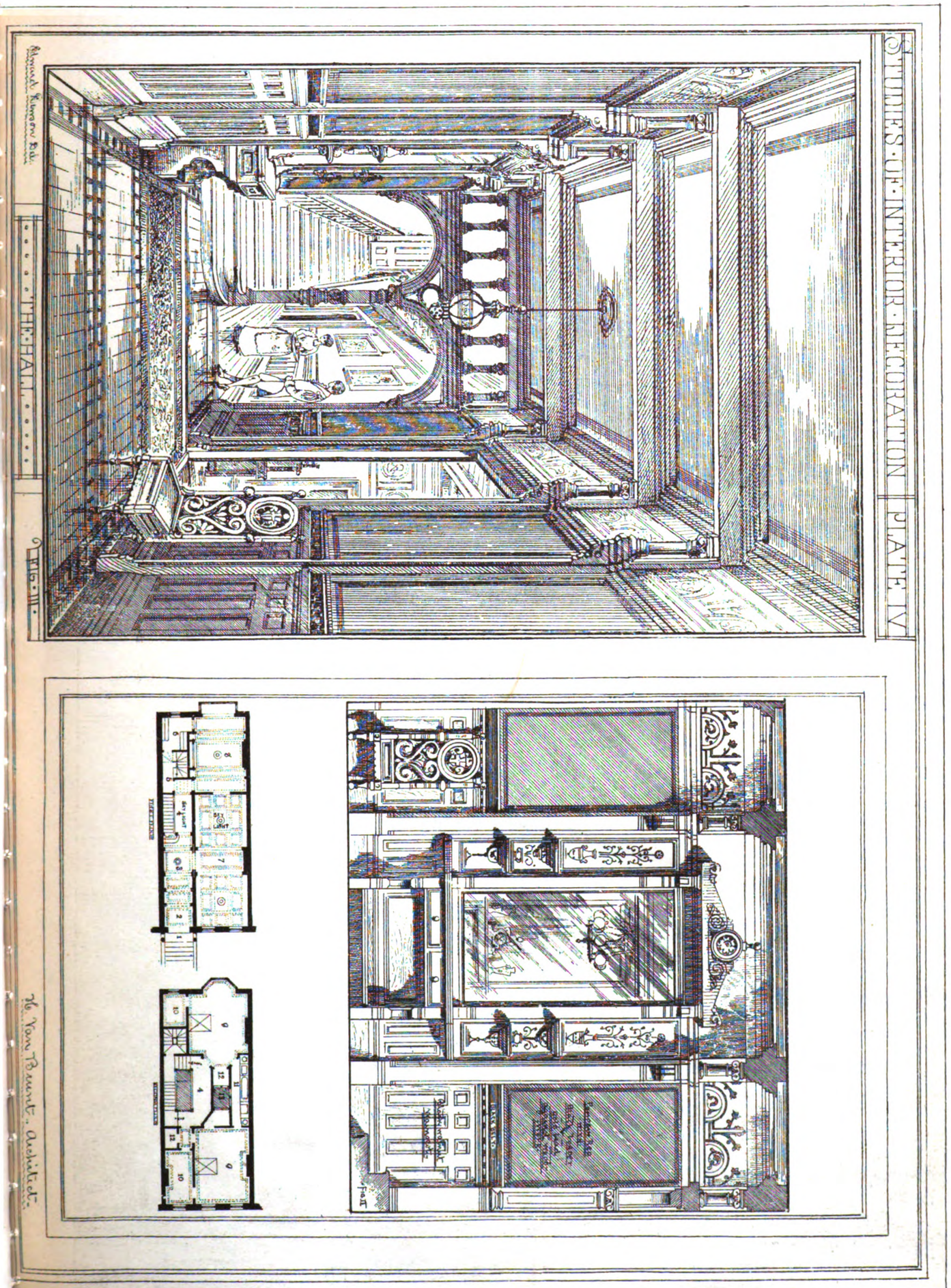

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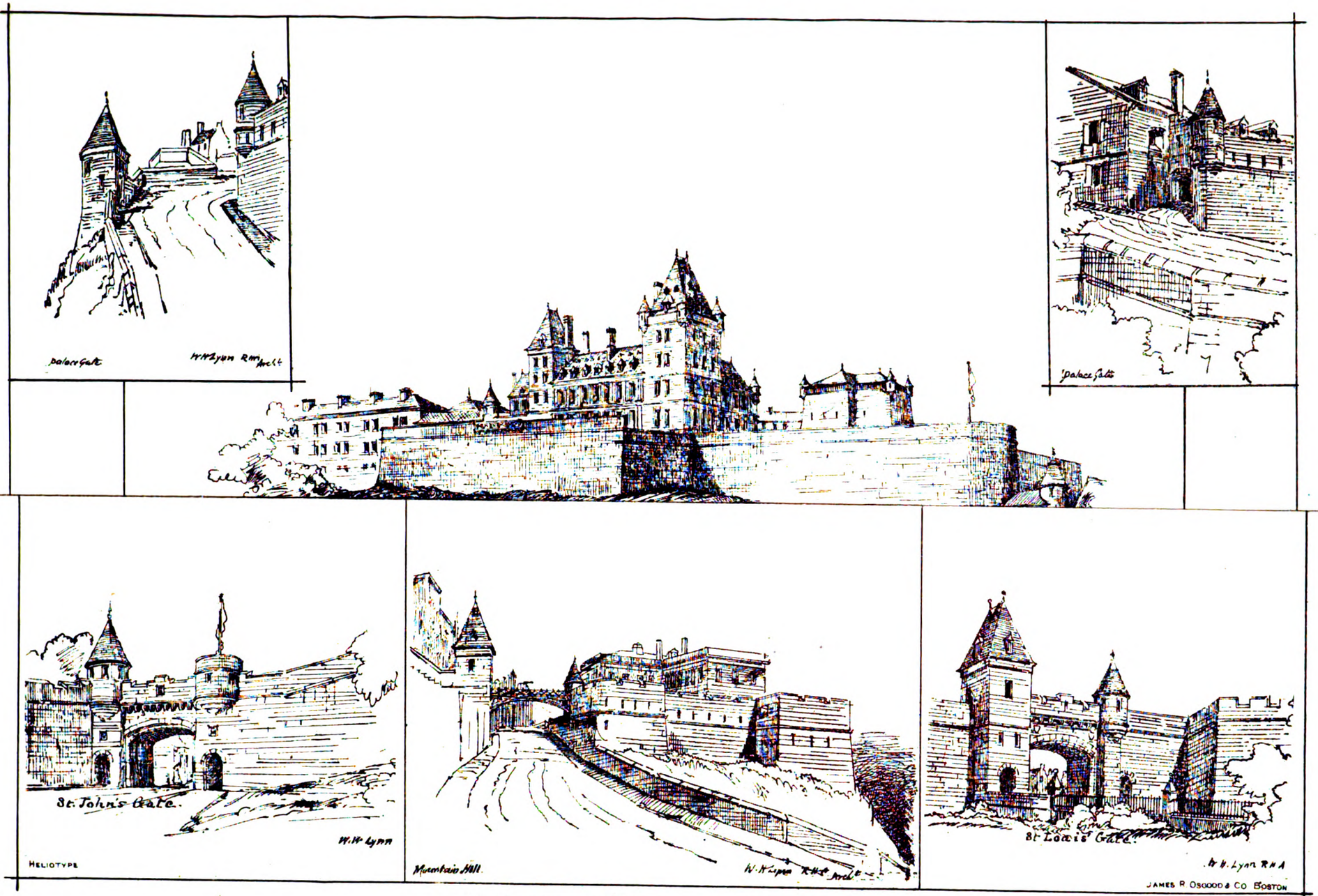

PROPOSED CHÂTEAU, ST LOUIS, QUEBEC.

DESIGNED BY W. H. LYNN.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, APRIL 21, 1877.

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THE Permanent International Exhibition which it is proposed to open in Philadelphia in May, and for which the main building of the Centennial Exhibition was bought at a price of $250,000, has received a set-back from the decision of the United States Supreme Court — which might indeed have been anticipated, one would think — that the million and a half of dollars advanced by the General Government to the Centennial must be repaid before any thing can come to the original stockholders. The subscriptions to the permanent exhibition were nominally about $630,000, of which only $130,000 was in cash, the remaining half million being in Centennial stock at par. This stock was estimated at sixty per cent, which would have made the half-million really worth $300,000; but it is thought that after the decision of the court it will not be more than half that sum. The funds available therefore for the exhibition are diminished to about $280,000. The directors of the permanent exhibition are not disheartened however, and propose to increase their capital stock to $600,000, raising new subscriptions of Centennial stock and of cash, for payment for the building and for running expenses. They hope at least to have a working capital of fifty thousand dollars, over and above the price of the building, which they think will be enough for their needs.

THE success of such an exhibition as is announced is to be desired for the country's sake, and would be of peculiar advantage to a city where manufactures are so important as those of Philadelphia. The real value of it would of course be as a school of instruction to our manufacturers and workmen. It is said that the president of the new exhibition has been studying carefully the scheme of the Crystal Palace Exhibition at Sydenham. We have read a saying of Byron's, that when he would write a poetical romance he read all the others that he could find, so as to know what not to introduce into his own. It may be hoped that a similar forethought guards the president's study of that rather seedy establishment, which has degenerated into little else than a place of cheap popular amusement. It is to be hoped too, that the Philadelphia exhibition will be preserved from the danger of becoming a mere bazaar for the exhibition of wares on sale, a danger which besets all great exhibitions, and becomes serious when they are made permanent. The men who managed the exhibition of 1876 with so much judgment, propriety, and success may be expected to recognize and avoid these dangers.

THE burning of the Southern Hotel in St. Louis, and the death thereby of a dozen or so of its inhabitants, gives a new direction to the general anxiety aroused lately by the disasters in theatres, churches, and halls. Hotels are less inflammable than theatres and than some kinds of factories, but except these there is probably no class of buildings which is so apt to burn. It would probably be difficult to find a large hotel which has been occupied a dozen years that has not been on fire. Their only security is in the fact that there are always a good many people up and about in them, and that a fire is therefore usually discovered before it is too late to put it out. This safeguard however was delusive in the case at St. Louis, if we may believe the story that the mayor of Topeka, who had a lower room in the hotel, found smoke in it early in the evening, and having twice complained of it to no purpose changed his room and went confidingly to bed in the fourth story. We have seen no official statement of the origin of the fire; but the common belief, unopposed so far as we know, is that it caught in the lower story, and was carried up through the elevator-well to the upper story where it first declared itself.

OUR large hotels of this day have certainly become, as far as danger from their burning is concerned, as unsafe structures as could well be devised. Only in theatres and steamboats can people be said to be in greater peril. They are so enormous and costly that it requires good management to secure a satisfactory rent from them, and the added cost of making them fire-proof looks appalling. We doubt if there has ever been a serious attempt to make one of them fire-proof in this country, unless in the case of the new Palmer House in Chicago, in which some precaution of the sort was undertaken, with we know not what result. They are complicated structures, of great area, and five or six or more stories high, in one of which several hundreds of people sleep, crowded into the upper stories, since many of the lower rooms are used as parlors, and so complicated in plan that a lodger often has to find his way through a long labyrinth of passages before he gets to a stairway, which he seldom hits on the first trial. The luxurious habit of using elevators adds greatly to the danger; for people became unused to the stairways, and do not know where to find them, while for purposes of escape the elevator is a mockery. The stairways, floors, and partitions are very combustible and honeycombed with continuous hollow spaces, flues in which it is extremely difficult to trace the movement of fire, and through which it often travels unsuspected, to break out a long way from its starting-point. The elevator-wells themselves are lined with combustibles, and by their upward draught quickly carry the flames which come near them up through the whole height of the building, while their openings communicate them readily to every floor.

THE people of Cincinnati have been amusing themselves considerably of late over a quarrel between neighbors, which has some points of interest for architects. We have already mentioned the Emery Arcade which is building in Cincinnati. It, and the buildings which are connected with it, abut on, and enclose on two sides, a private yard in the rear of Mr. James Gilmore's house. The Messrs. Emery elected to open a series of windows overlooking Mr. Gilmore's yard, and apparently without awaiting the permission which it is customary to ask in such cases, set a row of bull's-eyes in their wall on the north side of it. To this Mr. Gilmore objected, but without effect till it was discovered that the Messrs. Emery's surveyor had indiscreetly advanced their wall an inch and a half over the north verge of Mr. Gilmore's lot. This brought them to terms, and they signed an agreement "to close and keep closed the circular windows now open on the north end of Gilmore's lot," in consideration of an agreement on Mr. Gilmore's part to waive his right to pull down so much of the wall as stood on his ground. This agreement secured, they continued their building, putting in the wall on the east of the yard a range of windows in the lower story, and above them a tier of bull's-eyes, one in each of six stories. They took good care this time, as may be supposed, to keep within their line, maintaining that since in the agreement no mention was made of windows on the east side, there was a tacit understanding that no objection should be made to them. Against this sharp practice Mr. Gilmore stoutly protested; and finding protestation of no avail, he built up a brick wall in front of the lower windows, and in front of the tier of bull's-eyes a half-round stone tower forty feet high, flattened against the wall, from the stages of which he could doubtless improve on their lesson by observing his enemies at leisure through the objectionable bull's-eyes. This, which they consider a breach of faith, has angered the

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Messrs. Emery to that degree that they propose to sue Mr. Gilmore in damages to the amount of twenty thousand dollars for cutting off their light and air; and it has excited the people of Cincinnati to such admiration that the points from which Mr. Gilmore's tower can be seen are publicly advertised, 'tis said.

THERE appears to be no doubt that the report of Gens. Kurz, Gillmore, and Duane, on the foundations of the Washington Monument, has at last been presented to the Commission, and has declared that it will not do to finish the Monument as has been intended, the ground under it not being solid enough to make it safe. We presume that this will decide the matter, at least against the original design. It does not yet follow that it cannot be converted into something more creditable; but it is greatly to be hoped that no attempt will be made to do it without getting designs from the most capable persons that the country can furnish, and securing the careful judgment of well-qualified persons upon them. One suggestion which has been made, and which does not seem to promise well, is to set a colossal statue of Washington on the stump as it stands. We are at a loss to understand the indignation with which some newspapers which have tried the case to their own satisfaction hail the opinion of the distinguished engineers who have condemned the foundation. One Boston journal says naïvely, "Practical builders who have also made examinations, but who have no jobs to advance, say that the shaft can be built upon the present foundations."

THE last touch of gilding has not long been laid on the Albert Memorial in London, when one Mr. Hills of South Kensington comes forward with a proposition to build another Crystal Palace to cover it up; and Mr. Bedborough, the architect of the marvellously ugly Westminster Aquarium, has brought out a design for the building which should cover it. It is intended to be of iron, copper, and glass; is to be in plan a central octagon two hundred feet in diameter, with four wings of twenty-seven by eighty feet on its cardinal faces. Over the central part is a dome of one hundred and thirty feet in diameter, its springing line one hundred and forty-five feet from the ground, and the lantern that crowns it rising to three hundred and forty feet. The design is said to be compact of clustered columns, gables, pinnacles, traceried spires, and "cuspated" arches. The centre is to shelter the Memorial, the four wings to contain gardens with trees and plants "representing the vegetable kingdoms of the four quarters of the globe." The Prince of Wales, we are told, "was graciously pleased to signify his approval of the scheme," — rather heedlessly, we should think. We had thought that the people of London, with the Royal Albert Hall before their eyes, must be tired of building huge and unprofitable buildings of questionable design in that neighborhood. Of the Memorial the *Saturday Review* says discreetly, "It is on account of its fine proportions and stately elevation that the monument has its chief claim to public admiration; and it is obvious that this aspect of it would be lost if it were shut up in an ugly glass case, so that it could only be seen in snatches." Moreover it was built, we believe, by general subscription and from public funds, and is now public property, and so not a subject, one would suppose, for the experiments of private projectors. That another architect should bring forward in the guise of protection a project for obscuring and belittling Sir Gilbert Scott's famous monument under his very nose, looks much like what we should call professional impertinence. We cannot believe that the project will be carried out.

THE *Architect* quotes certain questions concerning fees that have been considered among the French architectural societies, and answers that have been given to them. How, it was asked, shall an architect fix his commission for a building for which his client has furnished the material? and how fix it when the work is executed by the client, who renders no account of cost to the architect? To these it was answered that the regular commission being five per cent (for work which costs over five thousand francs) on the value of both material and labor employed, the architect should, if the working accounts were given him, make up from them an estimate of material, or of material and labor if the client furnished both, and tax it. If no accounts were given him, he must make the best estimate he could, and charge upon that; and an extra fee should be charged for making the estimate, over and above the five per cent. It was suggested that the estimate might be furnished by another architect, a thing that would certainly seem to be desirable for avoidance of disputes. The decision agrees substantially with the usage recorded in the table of fees published by the American Institute of Architects, except that in that no provision is made concerning the architect's estimate. The *Société des Alpes Maritimes* has adopted a tariff which contains some special provisions. Small works, of a thousand francs in cost or less, are to be charged for by time. Commissions are to be seven per cent on cost up to five thousand francs; on costs above that, five per cent. This, taken literally as we find it stated, would mean on a cost of five thousand francs a fee of three hundred and fifty francs, on six thousand a fee of three hundred, which probably is not intended. For work done outside the commune in which the architect lives, the fees will be, up to five thousand francs, eight per cent; above that, six per cent. The rule is laid down which obtains here, though it is not here so well understood as it should be, that the commission is reckoned on the whole cost of the completed work, including paper-hanging, decorating, and gas-fitting. For partial services the fees are somewhat different from those to which we are accustomed, the division of work being different: thus, up to a cost of five thousand francs, for general plans and estimates (approximate) two per cent; for a complete design, plans, elevations, and sections, with estimates, two and one half per cent. Above five thousand francs the charge is one half per cent less.

ARCHITECTS' ESTIMATES.

ONE often hears complaint of the inaccuracy of estimates of the probable cost of work furnished by architects, and expressions of disappointment that they do not agree with the actual cost of execution, or sometimes even intimations that architects are in this respect incompetent for their duties. In view of this difficulty and the misunderstandings to which it gives rise, it is worth the while of architects to take some pains to make it understood what an estimate is, a matter on which it will be found, we think, that a good many false notions are current. From this question and the accusations that depend on it, we ought to separate the complaint which is also sometimes made, that houses built under the direction of architects are apt to cost more than the contract prices by reason of "extras." This, which we think is no more true, and probably less true, *cæteris paribus*, of houses built by architects than of others, depends on entirely different considerations from those that concern the actual or estimated cost of a fixed amount of work, and may at this time be left aside. But before any thing is said concerning the standard and value of an architect's estimate, it ought to be noted that the making of estimates — of close estimates, we mean, such as are expected when a contract is given — is not a part of an architect's duties at all. It is expected, and fairly, that an architect's experience will enable him to make a good guess of the probable cost of a building, such as the builder who should execute the work might make; and in this case the guess of a competent architect is usually as trustworthy as that of a competent builder, or of anybody else, but in either case it is nothing more than a guess. He will also be able, by comparison of work already done, allowing for the special characteristics of that which is before him, to form a reasonably secure judgment of the cost of a building in proportion to its size, and so by computing its area or cubic contents get at a rough estimate, which will be better than a guess. But to make a close estimate is the business either of the mechanics who are to execute the work, or of a special class of men, building-surveyors. The surveyors are not many in this country, and are chiefly referred to for preliminary estimates of public buildings, where the fact that the persons who provide the money are not those who control the spending of it makes special precaution desirable. But in England and in France the building-surveyor is an important functionary, and is constantly in demand, — in England to estimate the cost of work, and to take out the "quantities" of the various materials employed for the use of the contractors who fur-

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nish prices; and in France for measuring the work when it is done, and determining the sums to be paid for it to the mechanic. There are various reasons why it would be worth while to encourage the custom of employing surveyors in this country; and as the usages of building become more definitely established, it is likely that such a custom will grow upon us.

A good deal of misapprehension springs from taking it for granted that the cost of a house is a fixed thing, determinable by a definite standard, like the market price of a bushel of grain or a ton of coal. In reality it is a very indeterminate thing, depending upon the combination of hundreds of elements, some of them very uncertain, and others well defined but varying greatly according to the opportunities of the individual who is to furnish them. It depends on a builder's facilities for buying material, or his luck in it, on the market price at the time that he may have to buy, on the stock that he may have in hand, on his skill in economizing it; it depends also not only on the price of labor, which fluctuates, but on the kind of men he employs, and often on their number, on the organization of his shop, the amount and kind of machinery he uses, and on his skill in the management of work. These things go to make up the cost of the work actually rendered by the builder, and of course must vary with each individual. To the estimate he renders other causes of variation concur, — the personal remuneration and profit he is willing to accept, the degree of faithfulness with which he proposes to do his work, and his caution or boldness as a speculator. To one who thinks of these things it is hardly to be expected that two estimates for the same work should agree; and in fact they seldom do, as we see in competitive bids. The various elements of uncertainty may, it is true, like the risks of an insurance company, when there are enough of them, neutralize each other in the mass, and produce a result tolerably uniform among competitors; but they are likely also to accumulate and produce an exaggerated discrepancy.

But even these are not all the conditions of difference. Dr. Holmes in a famous passage says that into every colloquy between two persons, John and Thomas, there really enter six interlocutors, — the actual John and the actual Thomas, and the ideal conceptions which each holds both of himself and of the other. This ingeniously described complexity is almost matched by that which enters into the procuring of estimates for a building-project. The architect who designs the building has his conception of the amount and quality of material and workmanship which are needed to make it what he would have it; he also has his conception of the habits and character of the builders who are to execute it, of the explanations he must make and the precautions he must use to insure what he wants to have done. On these he bases the description he makes of his design by means of drawings and specifications, with a precision greater or less, but which in the nature of things never can be complete. The mechanic who estimates has his own habits of work, and his idea of what is expected of him by the architect; on some sort of compromise between the two, he founds his interpretation of the directions that are given him, and his estimate. In truth, whenever a house is built, the execution of the work is directed in a great degree by what may be called an unwritten specification, made up of the usages, mechanical habits, and common understandings of the building-trades and the architects. However carefully the written specification is drawn, the larger part of the working directions are necessarily taken from this unwritten specification, and are the subject of merely tacit agreement when an estimate is made. Though the traditions and habits and understandings which constitute it are definite enough to allow of the carrying on of work without great practical inconvenience, they are not definite enough to give different persons identical ideas of how the same piece of work is to be carried out. As all architects know who have directed a variety of mechanics, no two of them will build the same house in just the same way; and in carrying on work, except between those who are personally familiar with each other, there is constant comparison and adjustment of ideas between architect and mechanic, growing out of their different interpretations of the unwritten specification. These differences of interpretation are of course reflected in the estimates that are given for work; and the less rigid and unchanging the habits of the community, the greater will be the discrepancies among the estimates.

In view of all these things it would seem remarkable if estimates for the same work did not vary greatly; and in fact we find that figures of good mechanics are apt to differ by a quarter or a third and even more. Bids sent in in competitions vary by a still wider range. A correspondent has very lately called our attention to some cases in his own practice. A piece of stonework for which detailed drawings were furnished that showed the size of every stone, brought estimates which varied from $23,000 to $51,000. The contract was satisfactorily executed by the lowest bidders. The estimates for a chapel ranged from $15,000 to $22,000; in a contract for ironwork, from $40,000 to $69,000. Looking into the first number at hand of the English *Architect*, we find four successive series of tenders, varying in the first case from £1,495 to £1,097; in the second from £597 to £378; in the third from £849 to £478; in the fourth from £583 to £320.

An estimate, then, is to be regarded as a relative, not an absolute thing. There is very little assurance that two men will give equal bids for the same work, and the knowledge that the men are both trustworthy and capable does not add materially to the assurance; nor is there any security that estimates made by the same man at different times will agree. Still less is it to be expected that any man shall agree to abide by the estimate of another. The estimate of a builder is merely a statement of the price for which he individually, at a definite time, and under special circumstances which he alone can take into account, will do a certain specified work. The estimate of a surveyor, or of an architect if he furnishes one, tells the amount for which in his best judgment he thinks some one can be found to do it. It is valuable as a standard of comparison, more or less approximate, for the estimates furnished by builders in competition, or as a serviceable indication of the cost of work before it is undertaken, or a check upon it when the work is done by the day.

It is not to be wondered at, if when there is so much variation and so much reason for it, in the estimates of men who assume the absolute responsibility of carrying out building-plans, there should be variations between that of an architect and the actual cost of the work. These things ought to make it clear that an architect's judgment of cost cannot be expected to be a standard of precision; nor can any one's else, unless it involves an actual agreement to perform work for a stipulated price; and architects should take care to guard against the acceptance of any such notion. On the other hand, it is essential that the architect should have a good knowledge of the average cost of work; should be fitted by experience and skill to compare the estimates that are set before him, to approximate the cost of projects he brings forward, and in the case of work done by the day, or which requires extra allowance, to judge whether material has been provided at proper market prices and used with economy, whether workmen have been employed to advantage, and have done their tasks with reasonable diligence and care. Beyond the preparation of rough estimates it is better, we think, that the architect should not assume to go, and in practice he very seldom does. When a minute preliminary computation is required, it is better that it should be prepared by a surveyor, who, since he does nothing else, can do this better than anybody else, and working by general knowledge may hit a fair mean between the extreme proposals of bidders; and who will lift this responsibility from the architect, too often charged, in this country at least, with duties which are in our judgment complicated beyond reason.

STUDIES OF INTERIOR DECORATION.

VI.

We are now to consider the completion of the drawing-room shown in the plan on the fourth plate. The principal characteristic of this room is, as we have noted, its excess of length. This is corrected in our scheme by dividing it into two parts, each nearly square, by means of a transverse bay, of which the chimney-piece forms one end, and the door of entrance the other. This bay is continued across the entrance hall where a hall table balances the chimney-piece; the transverse dimension is still further emphasized by the common expedient of opposite mirrors. Of these two divisions of the drawing-room, the front receives light from two large north windows, and the rear from a skylight which forms the bot-

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tom of an area for air and light. This skylight at once draws our attention to the ceiling, which thus seems to demand especial study.

In order to accommodate this skylight, the floor over the drawing-room is framed around the opening with a construction of heavier timbers. To emphasize and decorate this construction is a natural expedient, and we find ourselves immediately engaged in considering how these beams may be made visible in the ceiling in such a manner as to form deep panels symmetrically arranged, of which the central and largest shall be glazed. The obvious result is exhibited by the dotted lines on the plan; and as the unity of the room is to be preserved for the sake of its effect of space, the ceiling of the front part is submitted naturally to the same treatment, the apparent beams actually coinciding with the arrangement of the partitions and trimmer-beams in the rooms overhead. But all this show of construction in the ceiling must evidently be subordinated to the two main cross-beams which mark the central transverse bay. These accordingly we make much deeper and more important than the others, and give them a bearing upon pilasters and columns whose function it is to frame in and form a part of the wall features, viz., the chimney-piece and doorway; thus connecting the walls and ceiling, and by a purely architectural treatment enhancing the importance of the transverse bay, which must remain the leading *motif* in the whole composition.

To support the wall ends of the lesser beams upon pilasters or corbels would give them an importance inconsistent with their subordinate character; the pilasters would subdivide our wall spaces in such a manner as to interfere with the hanging of pictures and the placing of furniture, and present an architectural composition quite too formal and monumental for so small a room. We therefore propose to give these minor beams a bearing upon the upper member of a boldly projecting cornice of wood, the detail of which is continued from the main wooden cross-beams, which are thus united with the rest of the room, and escape the peril of isolation.

But the most serious difficulty which we have to encounter in the treatment of this room is to avoid the gloom which must naturally pervade the rear part of it. It is too far from the front windows to receive much benefit from these; and the skylight is insufficient in itself, shedding its light mainly upon the floor, and leaving the upper parts of the walls during the daytime in obscurity. We remedy this obvious defect by borrowing the south light from the large dining-room bay window through an open frieze in the rear partition wall of the drawing-room. The constructional character of this frieze is determined first by the height of the double door which affords communication between the two rooms, and dictates the width of the frieze, and second by the short pilasters which are necessary to enable this partition to perform its functions of support for the floor above. These pilasters divide the frieze into open squares, which should be filled with stained glass in light tones. This device illuminates a partition otherwise gloomy and forbidding, and breaks up the obscurity in which the side walls and the ceiling-panels around the central skylight would otherwise be plunged.

It now remains for us to consider the treatment of the side walls, which are to be brought into harmony with these features of decoration which our conditions have already suggested. The end walls of the central transverse bay are entirely occupied by the woodwork of the chimney-piece and entrance door; and the partition between drawing-room and dining-room is also largely composed of wood. The room is not large enough to allow these masses of woodwork to remain isolated, like pieces of furniture. They must therefore be brought into place by some especial treatment of the side walls, which shall unite them into one composition. To this end we seize on the important *motif* of the glass frieze at the end of the room, and continue its lines and characteristic features on the walls in wood, the panels between the pilasters being occupied with decorative painting, harmonious in subject and color with that on the glass.

Thus black walnut becomes predominant in the room, and it is incumbent upon us so to treat it that it shall not detract from the air of gayety and brightness which should strike one on entering. To this end the wood is finished light without gloss, and the mouldings are broken up into delicate members, one of which in each group is gilded. The screen surfaces of the walls should be roughened or embossed with gold figures upon a buff or amber ground, leaving to the frieze-panels above a contrast of flat and smooth treatment in tints borrowed from the stained glass on a pale tea-green background, each panel being bordered by a gold bead. The lead-work of the stained glass should be gilded. Black should be avoided in such a room, and the chandeliers and sconces should be fire-gilt with polished reflecting surfaces, and bear grouped candles. The panels of the ceiling should be affected by the stained glass in the skylight, and, like it, might have a background of cream-color and brown. An embossed paper with an arabesque tangle of geometrical figures in such tones would so occupy these panels as to bring them into a condition of peculiar harmony with the ceiling beams.

Our aim is to obtain an effect of *singing brightness* in this room, if the expression is allowable, and whenever we apply color, whether in paint, stuffs, or wall-papers, to do so in such a manner as to create not merely a "dressy" background, but to prevent the comparatively dark wood of construction from forming anywhere isolated or strongly marked lines or masses of sober color.

Plate V. suggests wall-hangings of light amber or gold-color, perhaps with pale red figures. This drapery is suspended from brass rods with fire-gilt rings under the black walnut architrave moulding which separates the frieze from the screen-surface of the walls. To enhance the value of this stuff, the wall beneath, where it is occasionally betrayed, might be covered with a paper having embossed gold figures on a light-brown, coffee-colored, or buff background.

To confer warmth and splendor upon the room, the window-curtains should be of red damask with a narrow border at top and a broad border at bottom of amber stuff, divided and at irregular intervals broken by horizontal bands of dark red velvet of various widths, the one separating the broader mass of amber from the red damask field being the most important, and decorated perhaps with rosettes of gold-color or red. This damask-red is to be faintly echoed in the wall-hangings. We would suggest for such curtains, a rich gold cornice and a straight lambrequin, bearing a knotted silk fringe of yellow, with heavy fire-gilt hangers. However eager we may be in our search for novelty, we can find no expedient or device so appropriate as a long mirror occupying the space between the front windows, with a bit of white marble statuary beneath upon a corbelled table. The curtains play upon rods, and are capable of enclosing the windows at night.

To assist in marking the architectural divisions of the room into two parts by a central transverse bay, and to balance our somewhat over-weighted ceiling, we would cover each half with a rug rich in texture and color, and large enough to conceal the greater part of the floor in each case. These rugs should be similar in texture of course, but not necessarily in design. The floor-space between, which belongs to the transverse bay, we will have in polished ash, the bases of the opposite pilasters being connected by broad bands of black walnut. On this space a thick rug may be thrown in front of the fire, which may be furnished with brass fire-dogs and green tile facings; the fireplace itself being lined with silvered metal to reflect the cheerful blaze. If, for the sake of warmth and comfort, it should seem desirable to cover the entire floor with carpeting, we would suggest for such a room, in each half, light gray or green centres with an undistinguishable figure and a rich pile, a border with predominant red like the curtains, and a marked formal figure; this border to be separated from the boundaries of the room by a plain filling of maroon, on which will stand the heavy wall-furniture. The carpet thus becomes a symmetrical rug with no essential part of it so covered as to prevent it from defining the shape of the room. From the point of view of decoration, every room except museums or picture-galleries is more important than its contents; any device therefore which, like this treatment of the carpet, assists in marking and drawing attention to its structural symmetry, or in establishing its unity of design, must be of value. Modern life crowds such a room with furniture, and distracts the attention with pictures, bronzes, marbles, vases, books, and bric-à-brac. In the midst of these distractions, if the room itself fails to asserts itself and to impress upon the mind of the beholder an idea of a symmetrical unity which is decorated and not swamped by such details, there is a fundamental error in the treatment of it. H. V. B.

THE ILLUSTRATIONS.

HOUSE AT NEWTON, MASS. MESSRS. APPLETON AND STEPHENSON, ARCHITECTS.

(10 Pemberton Square, Boston, Mass.)

THIS house, built for George W. Mills, Esq., of Newton, in the fall of 1876, is of wood, with slated roof, and cut shingles in the gable.

STUDIES OF INTERIOR DECORATION. — V.

See preceding article.

PROPOSED PARSONAGE FOR TEMPLE EMANUEL, NEW YORK. MR. HENRY FERNBACH, ARCHITECT.

(346-8 Broadway, New York, N.Y.)

CENTRAL HIGH SCHOOL, CLEVELAND, O. MR. L. T. SCOFIELD, ARCHITECT.

(Case Block, Cleveland, O.)

THE SANITARY CONDITION OF CITY HOUSES.[1] — I.

A SUITABLY built, suitably arranged, and suitably surrounded city house is probably the safest of all human habitations; but a suitably built, suitably arranged, and suitably surrounded city house is probably the rarest of all human constructions.

The country house gets from its isolated position a full bath of sunlight, and a free circulation of pure air, which counterbalance

[1] A paper read before the Public Health Association of New York, by George E. Waring, jun.

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many of its customary defects. But in spite of this, its defects are often pronounced; and deleterious influences arising from soil exhalations and from improper disposal of wastes are often very serious.

A city house with an absolutely impervious sheet of concrete between its cellar and the underlying ground, with impervious cellar walls, with due protection against the rising of damp through its foundation, and with a sufficient circulation of fresh air through its cellar, is practically isolated from any source of danger connected with the ground over which it is built. The earth in front of it is covered with pavement, protected against undue saturation by its ability to shed rain; and the earth behind it is either covered in like manner with close pavement or has its exhalations filtered by the vegetation of its grass-plat, — so that, supposing the whole area in its neighborhood to be protected in like manner by the belongings of other houses, there is little to fear from a malarious condition of the ground. Supposing every house in the neighborhood to be thoroughly well protected in the manner indicated, it might stand over a pestilential swamp without much danger.

It is no argument against this assertion, that such of the houses with which we are familiar as stand over the site of an original pond or swamp are subject to malarial diseases, because the usual manner of construction has left them without the necessary protection against ground exhalations. Probably to a certain extent the freest and best-drained soil acquires in time, from the character of the early occupation of town-sites, a certain degree of fouling which the absence of vegetation, and the crowding of houses so thickly as to exclude sunlight and the circulation of air, allow to become dangerous; and there is frequently an undue amount of ground moisture which affects foundation walls and cellar bottoms as these are usually built. The extent to which the unwholesome influence of the ground air and of moisture from the soil is felt by the occupants of town houses varies, of course, very much according to the original character of the ground. Where the ground is dry and sweet there is little to be apprehended. The ordinary ventilation of the cellar, which comes from careless workmanship, is generally sufficient for safety; but in proportion as the dampness or foulness increases, in just that proportion careless building becomes dangerous.

We know very well, from a difference in salubrity between houses standing on proper sites and houses standing on improper sites, that this influence of soil emanations is serious; probably, so far as the usual slighter malarial ailments are concerned, this soil influence is the most serious with which we have to contend. At the same time the debilitating effect of the exhalations referred to, headache, neuralgia, loss of appetite, intermittent fever, etc., take a far lighter hold upon the popular imagination than do the often fatal diseases which are produced by bad air of another sort. The low condition and consequent susceptibility to infection which the malaria of damp soil produces doubtless aggravate very seriously the dangers arising from the other source; that is to say, persons enfeebled by exposure to malaria would often succumb to infection, when a robust and vigorous person would withstand it. Mankind has been too long accustomed to living in the face of threatening infection, and has been too long educated in the belief that all fatal disorders are to be accepted as the chastening work of God's inscrutable purpose, for us to hope that the average man will at once realize the degree to which his life and health are dependent upon the manner in which he controls the circumstances and conditions of his living. Happily, it is coming to be well recognized that typhoid fever, diphtheria, cerebro-spinal meningitis, and various grave disorders of the bowels, are the crop produced by planting in the system certain floating impurities of the air, whose action is as direct under favorable circumstances as is that of the spores of penicillium in producing a crop of mould when planted on the surface of a damp boot. It is not necessary to discuss here the merits of the "germ" theory. It will hardly be disputed that, whatever we may call the agent of propagation, there is an active agent peculiar to each disease. If we plant cowpox we grow cowpox, if we plant smallpox we grow smallpox, if we plant typhoid we grow typhoid; and so on throughout a long range of diseases whose limit is not yet defined.

Whatever our seed, our crop depends greatly upon the soil in which it is planted. In the case of a vigorous, active person, of strong constitution, and living under wholesome conditions, it falls on sterile ground and is lost, while the same seed sown in the blood of the weakly may produce its fatal crop with certainty and abundance.

It is largely in connection with the influence of the constitution upon liability to infection, — in addition to the minor disorders and discomforts resulting from the rising of swamp malaria and the conditions which produce fever and ague and neuralgia, — that we have to consider the importance of excluding the ground air from the house. It is probably but rarely in city building that there remains in the subsoil such a degree of foulness as to produce typhoid fever and similar diseases; but the instances where a liability to fall before their attack is produced by this sort of unwholesomeness are by no means rare.

The causes of grave infection are precisely the same in the city that they are in the country, and they grow in both cases from improper protection against the emanations from the organic filth which is a necessary product of all human life. In the country it is perhaps less often by the fouling of the air than by the fouling of the water that these diseases are spread. In the city, the water-supply coming from an untainted source, the infection is almost invariably through the medium of the air which we breathe.

We are very far from possessing such accurate knowledge of the conditions of decomposition which favor the multiplication of the germs of disease, or the production of such a condition of the air as produces disease, that it can be demonstrated with scientific certainty that under such and such conditions typhoid fever will be produced, and under such other conditions its production will be impossible. It is a case when we have to accept purely circumstantial evidence.

No analysis of the water-closet drainage which oozed into the Broad Street pump in London demonstrates to us that germs of cholera were communicated to its reservoir; but it *is* known that a water-closet whose outflow reached that well was used by a cholera patient, and that within a week more than five hundred persons scattered over one of the best parts of London, and even as far as Richmond Hill, whither they had fled to escape the plague, but whence they sent to this pump for water, were killed by cholera; the only possible communicating link between the individuals of this scattered multitude being that they drank this water.

We know by frequent observation, that persons living in houses into which poisonous gases are poured through the honeycombing of lead soil-pipes, or the inefficiency of wash-basin traps, are liable to fall sick with diphtheria or typhoid fever. We know that when the defective pipe has been removed and a tight one substituted for it, or when the faulty basin outlet has been closed, such diseases cease. We do not know precisely what condition of the air escaping from the imperfect pipe is necessary to produce the disease. Therefore, all that is said concerning this branch of the sanitary subject is to be taken as the sum of empirical knowledge and as being in so far unscientific that our deductions are not susceptible of clear demonstration.

Let us set aside the question as to the manner in which zymotic diseases originate, and assume that it is demonstrated that they are frequently caused by improper drainage, and by the admission of drain air into living-rooms; taking this as a starting-point we find two most serious questions to be considered: —

1. How shall we keep out of the house the influences arising from the ground beneath it and beside it, which tend to produce a low condition of health, and to create a susceptibility to zymotic poisoning?

2. How shall we protect ourselves against such zymotic infection as comes to us from within or without the house as a result of improper methods for the public and private disposal of the wastes of the body and of the domestic economy?

Concerning the injurious ground air, it may be assumed, however serious the difficulty, that it may be nearly or entirely remedied by a thorough draining of the soil below the level of the house cellar, by making the cellar-floor, the foundation-walls, and the pavement and walls of basement areas, hermetically tight; and by providing for the complete, even if very slight, ventilation, of the cellar itself. This is recognized on all hands, at least so far as the cellar wall and foundation are concerned, as being necessary to the best building. In time it will come to be absolutely required by public authorities who have the regulation of the way which builders' work must be carried out.

That the importance of this complete separation of the house from the ground under and about it is by no means popularly regarded as essential, our daily observation proves. Those contractor-built rows of cheap houses, built by the block and sawed off in sixteen-foot lengths to suit the demand, which have covered so many hundred acres of this city, are built almost invariably without the least regard to the influence of the soil below them upon the health of those who are to live within them. That convenient and taking compound American adjective "first-class," which makes every degree of badness acceptable to the ambitious mind, has its requirements fully satisfied by a certain conventional expenditure about the front and entrance door of the building, by high ceilings, and in these later days by a judicious touch of "Queen Anne" joinery and paper-hanging. The house may be the veriest rattle-trap that ever trembled over the site of a recent swine-yard; there may be the freest racing-ground for rats from garret to cellar; it may have twenty openings in its drainage system, which are separated from the street sewer only by ineffective and often inoperative water-seal traps; its foundation walls may leak, and its cellar may often hold stagnant water. With all these defects and with all the "scamping" of its work, which are evident to the practised eye, if its experienced builder has had the shrewdness to give it that touch of cheap finish which makes it "first-class," he may count on a price that will make his operation a good one. Should he be able to add the taking recommendation that the house has been built "entirely by days' work," it matters little that it was the days' work of apprentices and bunglers.

As a rule, one of the almost universal defects of New York houses is strictly fundamental. The proportion of houses of the costlier sort that would bear a rigid inspection as to the efficiency of their cellar-floors, foundation-walls, and areas, would be ex-

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tremely small. The gravity of this drawback is sufficiently understood by all who know the prevalent ailing condition of the women and children whom these houses shelter.

Much more serious, when measured by the death and pain that it produces, though hardly more so with regard to its effect on the health and efficiency of the people, is the question of disposing of the household wastes.

Men living in widely scattered communities find it easy, in their rude way, to get rid of the organic refuse that they produce, without serious injury to their health. As houses are made tighter and are more gathered together, the trouble increases with regard both to the waste of each household as reacting upon its own members, and to the influences that it may have upon the members of other households. When men gather together into closer built towns, they bring with them at first the institutions of the village, — the vault in the back yard, the leaching cesspool, and the slop-gutters. The method of life implied by the use of these systems are accompanied by defects of construction and ventilation which give them a high death-rate. It may be questioned whether, with a public supply of good water, there is any great amount of actual poisoning occasioned by such disposal of filth. Indeed, the statistics of health in Philadelphia show an exceptionally small death-rate in those districts where the slop-water of the house is carried away through surface channels, and where the gutters at the sides of the streets are almost constantly running with soap-suds and kitchen sink waste. The untidiness suggested by this custom makes it one of the first efforts of the dainty and fastidious to hide such matters out of sight by passing them away in covered channels.

CORRESPONDENCE.

THE "BEAURIVAGE" APARTMENT HOUSE. — THE DOUGLAS MONUMENT. — ACANTHUS PLANTS.

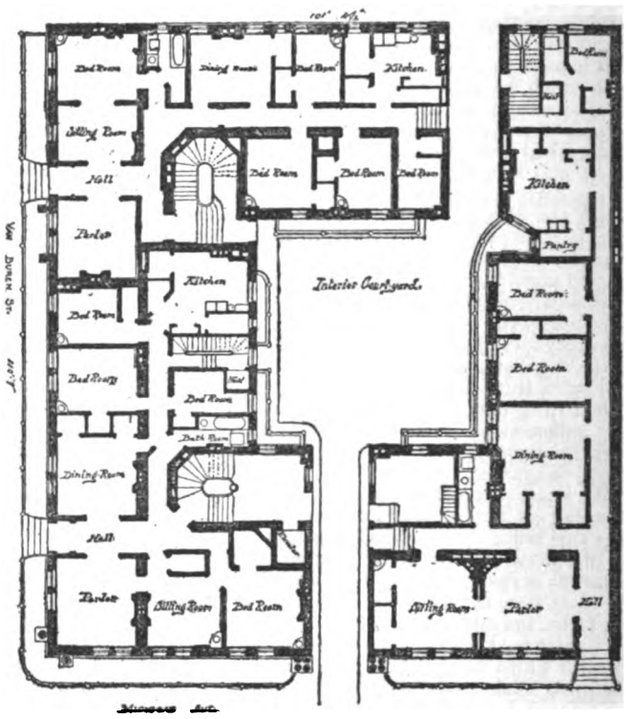
CHICAGO.

THE apartment house system — or as the people here are determined to call them, "French flats" — can no longer be considered an experiment in this city. There are numerous buildings thus designated; but most of them are only a superior variety of the "tenement house," having neither back stairs, coal-lifts, nor door-keepers, but in other respects being well arranged for small families where the household work is done without servants. Two houses of a superior kind were built on the "North Side" about eighteen months since. One belongs to Mrs. Brown, and was designed by Mr. Bauer; the other belongs to Mr. Wheeler, and was designed by Mr. Addison. Both are well arranged, but are not large. Neither one has a passenger-elevator, and there is no need for one. They have thus far been a financial success, and all the flats are occupied.

The new "Beaurivage," owned by J. K. and A. Fisher, and designed by James R. Willett, architect, is the first of the apartment houses such as are generally denominated "first-class," and of which there are already so many in Boston and New York. It has now been finished and occupied eleven months. The building is one of the prominent architectural features of Chicago, standing on the north-west corner of Michigan Avenue and Van Buren Street, fronting Lake Michigan and in full view of all the trains which enter the city by four roads. It has a front of 104 feet on the the avenue and 110 feet on the street, and is five stories high in addition to the basement. The exterior is of red brick and buff sandstone from the St. Geneviève quarries in Missouri, and the cornice and parapet are of Chicago terra-cotta. The three oriel windows extending from the second story to the roof indicate the position of the parlors in each apartment. There are three apartments on each floor, making fifteen in all. The general shape of the building is a hollow square, with a court forty feet square in the centre, and three exterior sides exposed to light — the third side fronting on an alley. This arrangement affords excellent opportunity for lighting. The apartments are so arranged that the principal rooms of each suite front on the streets. In this respect the house is one of the best ever erected.

The main entrance is on the centre of the Michigan Avenue front through a *porte-cochère* which passes directly through the building to the court. The back entrance is through another *porte-cochère* on the alley; but the front entrance as far as the court can be used for all purposes at the discretion of the janitor. There are two main stairways and two back stairways, the latter with freight-lifts delivering goods on the landings. All are approached from the court, except one of the main stairways which is entered from the *porte-cochère*. A water elevator, worked by direct pressure, is in conjunction with this stairway. On each landing of this stairway are two front entrances to apartments. The other stairway has one entrance on each landing. In order to make the elevator available in connection with this stairway, it is connected on each story with the other stairway by means of an open gallery supported on iron brackets. As the rooms passed by this gallery are for minor purposes, the window-sills are set up to a level with the eye of a person passing. This is a very ingenious feature of the arrangement. The flats are very large compared with those generally seen in New York, and consist of from nine to eleven rooms each. The house is most profusely supplied with plumbing; besides the usual appliances of kitchens, laundries, bath-rooms, and water-closets, every bedroom has a set basin supplied with hot and cold water. All the hot water for the building is supplied from boilers in the basement heated by coils of brass pipe. Each apartment has an ash-shute and garbage-shute, and a steam dry-closet furnished with Hawley's drying-machines. All the public and private halls are heated by steam by direct radiation. The steam work is on a very extensive scale, and taken altogether the steam and water works involve such a great expense for maintenance and repairs as to seriously impair the value of the whole investment. But the steam apparatus serves to furnish a very complete and thorough though necessarily expensive system of ventilation. The sanitary appliances are of the most perfect sort. All drain-pipes are of cast iron, and every drain-pipe of whatsoever size or nature is carried directly through the roof.

A peculiar feature of this house is the decidedly French arrangement of the ground floor and entrances. In this respect it differs



essentially from those which have been erected in Eastern cities, in which the *porte-cochère* has been abolished and the double entrance substituted. By returning to the foreign type the Chicago building is no improvement on the American system. The porter's lodge is opposite to the stairway and very inconvenient. He cannot see those who come in until they have passed the outer gate; and there is always a chance that among those unacquainted with this style of building there may be some who will turn away from what they suppose to be a stable entrance only. This is a fact, and it is not uncommon for the occupants of first-floor flats which have outside entrances to be annoyed by callers for the upper part of the building. The court is too small to be useful for carriages; there are no stables in the rear, as is often the case in Paris houses; and the *porte-cochère*, though a convenient means of ventilating the court in summer, is in winter only a conduit for howling winds and drifting snow. Altogether it is something which architects had better avoid in the future.

The Beaurivage is too large an affair to be an immediate success in a city like this. It is ahead of the times; but good management and a few improvements will not fail to result in a good financial showing for the owners in a few years. The rents are now what appear to be high for this city, ranging from $700 to $1,100, and only two apartments are now vacant. The building cost about $90,000, on land that is said to have cost $30,000. What it costs to run the house cannot be stated with accuracy, but it is too much to make the building a paying investment at the above rates.

An earnest movement is now on foot to have the Douglas Monument moved and finished. What there is of it now stands on the lake shore at the foot of Douglas Place (Thirty-fifth Street). It is on a lot formerly belonging to Douglas's estate, and I believe part of that given by him to the Chicago University. The site is entirely unsuitable for a monument, being in an unfrequented place and surrounded by dwelling-houses. The crypt in which are the remains of Douglas has been built with the four detached buttresses at the angles. Nothing has ever been done to the proposed colossal statue. The whole thing has been disgracefully neglected ever since the great Douglas celebration when his mortal remains were deposited in the tomb.

Several sites have been suggested, and the Commissioners of the South Parks have offered to give it ground-room on any suitable

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place within the parks and boulevards. They have lately sent one of their number to Springfield to confer with the Legislature now in session. He is authorized to propose that the Douglas Monument be placed at the head of Drexel Boulevard, whose name will then be changed to Douglas Boulevard; also that a monument to Lincoln be built at the head of Grand Boulevard, whose name is to be changed to Lincoln Boulevard.

Mr. Leonard W. Volk, the sculptor and designer of the monument, has made an excellent model for the statue, which has been described in these letters. It will be unfortunate, in case the monument is moved and finished, if the design is not placed in the hands of a capable architect to remodel. Such as it is, it is not worthy of a better location than it has. It is said that a legislative committee, which recently visited the present and proposed sites, will recommend that the ground it is now on be sold, and an appropriation be made for its completion.

I recently had an opportunity to see several varieties of the acanthus plant in the new botanical gardens in South Park. They were raised from the seed by Prof. H. H. Babcock. One of them will soon be in full bloom, and I will then endeavor to procure a drawing of it for your illustrated pages.

THE THIRD DISTRICT COURT HOUSE OF NEW YORK.

[From the Sunday *World*.]

The Third District Court House, jail, and bell-tower, which have just been occupied for the first time, are noteworthy on many accounts. They are especially noteworthy because they have afforded the first opportunity any architect in New York has used to design a building, of which the scheme was so complicated, on architectural principles. Our public buildings have heretofore fallen into bad hands, and have accordingly consisted of symmetrical façades designed without reference to what was behind them. Commercial buildings mostly consist either of a single room, as in a bank which occupies the whole of its building, or of a number of rooms devoted to like purposes, and calling for no variety of architectural expression. The purposes of the new buildings are various and highly specialized, though perhaps not more so than those of the old "New Court House" in City Hall Square. In that building, however, no attempt whatever was made to express them. The distinction of the buildings now opened in Sixth Avenue is that the design is distinctly an expression of the purposes of the building, that it varies as they vary, and that, the ground plan being established by the exigencies of the buildings alone, the architecture is rigidly developed from the ground plan.

Whatever style it is attempted in, it is evident that what is attempted in the Third District Court House is a much harder thing to do than to set up in front of a New York court-house and jail the front of a mediæval town-hall or a Palladian palace. The difference essentially is that in the former case architecture is treated as a living art, and in the latter as dead. The architect of the Sixth Avenue buildings, by committing himself to a sound basis of design, was forced really to "design" a new building. With so intricate and so peculiar a programme he could not compile it. Details of course he could find in abundance, but details would not serve him, nor even pieces of elevations, which perhaps he might have found. The whole resulting from the combination of these multifarious parts must be original. In such an attempt even a moderate success is a creditable feat, while to say of such a work that it is better in perspective than in elevation, and better in mass than in detail, is to assign its author a very high rank as an architect. This may truly be said of the architect of the new buildings. He has made a whole which is better and greater than any of its parts.

All the parts, though their chief value is as parts of the whole, are in themselves worthy of study; for the architect has given careful study to them. Before the jail was built, the fault most commonly found with the court-house was the relative shortness of the ridge-line of the roof, which was exaggerated by the metal ventilator at the end of it. It is one evidence of the study given the design as a whole, that since the jail has been done that fault has been much mitigated. It will be still further relieved when the market which forms part of the general design comes to be built, and the bulk of its great cupola is interposed between the court-house and the jail in the southern view, from which the defect is chiefly noticeable. It remains, however, and will remain, a drawback, though the architect's difficulties are obvious, and it is not obvious how he could have overcome them. It seems as if a hip-roof over the court-house front, instead of the gable which now completes it, might have helped the difficulty by making the length of the ridge a matter of less moment; and it would have had the advantage of recalling the sky-line of the jail in the lower roof of the court-house, while the loss of the gable would not have been great. The pinnacles which flank this gable and receive the thrust of the coping seem much too important for their function, and are mainly valuable on account of the carved corbels from which they rise. The gable of the guard-house facing the rear of the court-house is more naturally treated, and an elaboration of the same treatment applied to the front would have been an improvement. The Sixth Avenue front is in general a rich, careful, and effective composition; but the effect of it is somewhat marred by the manner in which the masses of stone forming the two gables are placed above the brickwork and entirely detached from it. The design of these gables as originally published, in which the brickwork and masonry were carried up together, and in which the coat of arms in the principal gable was much less conspicuous, has not been improved in the design executed. We decline to believe that the architect is responsible for the insertion of the balls of polished granite, which are the single offensive detail in the whole building. The openings, except the arch of the principal porch, would have been more effective if they had been deeper, or so moulded as to seem deeper. In parts, the front has a somewhat flat and shallow look, which is due chiefly to this cause. The drawbacks we have mentioned, except the granite balls, would almost be merits in our ordinary street architecture, and they are conspicuous here only because the front is in the main so good. The detail, much of it richly carved in stone, is well designed and well executed; and if this front were all of the building to be seen, it would be a valuable addition to our short list of artistic buildings.

But upon the whole the Sixth Avenue front, leaving out the tower, good as it is compared to almost any thing we have, is the least successful aspect of the building. It is distinctly less satisfactory than the flank on West Tenth Street. This is curious, considering that the Tenth Street front is much less elaborate and costly and very much harder to do. This does not look like scholastic architecture. It is perfectly free and highly picturesque. It is composed of so many and so various parts that great skill was needed to prevent it from becoming an uneasy jumble. On the other hand, it is altogether quiet and dignified. The slight "batter" of the granite foundation wall gives and does not exaggerate the sense of stability which is essential to the sense of repose. The brick wall of the jail-yard, rising at one point into the gable of the station-house, is a broad band of quiet color, which greatly enhances the effect of the jail which rises behind it, and the architect has shown his sense of the value of it to his composition by leaving it quite plain. The jail itself is imposing in the mass and duly severe and simple in detail; and the connection between the jail and the court-house, one of the most difficult points in the whole design, is managed with extreme art. The gable of which we have already spoken, which faces on this court, might almost, if we were to pick out details, be called the most successful detail in the building, and it is even better in its place and connection than in itself. The filling of the tympana throughout this front in decorative brickwork is skilfully done, and kept in its due subordination as a detail. All this work has a peculiar and striking charm. Not the least of its attractions is the material of the jail and its wall, a carefully chosen Hudson River brick of a better color and character, for this purpose at least, than the smooth, rather glaring and brand-new-looking pressed brick of which the court-house is built.

The tower is a noble object, and would be if it were set up by itself, but gains immeasurably as a point of departure and a point of convergence for the lines of the façades. The staircase turret, built up against it to provide a separate entrance for the belfry, is a source of additional picturesqueness. The great staircase which fills its lower stages is one of the noblest features of the interior. The transition from the cylindrical body to the square belfry, employed so as to show the clock-faces the belfry is meant to receive, is probably not the arrangement the architect would have chosen if he had been designing a purely monumental tower. Fergusson remarking that the natural transition is from the square to the octagon, and from that to the round, says that "the reverse arrangement is one which almost no art could render tolerable." Art enough has been expended on this tower to render it not only tolerable but beautiful, and to give it not only a plainly civic, as opposed to an ecclesiastical, but a highly individual character; and the transition from the round to the square, by corbelling in brick, is one of the most beautiful as well as one of the most characteristic features of it.

JOURNEY OF AN ARCHITECT IN THE NORTH-WEST OF EUROPE.[1]—IX.

ROMAN CATHOLIC CHURCH AT HAMBURG.

The porter at our hotel, who is a Roman Catholic, was intrusted to receive from his foreign co-religionists subscriptions towards the construction of a church, the designs for which he showed to us. We gave our mite to this useful functionary, and borrowed from him some drawings, which may perhaps interest the reader.

The ground-plan (fig. 146) consists of a porch leading to the nave, which is bordered by side-aisles, and terminated by a square chancel. The wide bays of the nave occupy the width of two of those of the side-aisles. All the vaults, both high and low, have bays at right angles to each other. Their angles are without mouldings, and they are intended to be covered with paintings. The pillars are square, and the edges are chamfered as far as a console, which forms a corbel for the spring of the arch. Small columns,

[1] Printed by permission from the advance sheets of a Journey of an Architect in the North-west of Europe. Translated from the French of M. Félix Narjoux. James R. Osgood & Co., Publishers.

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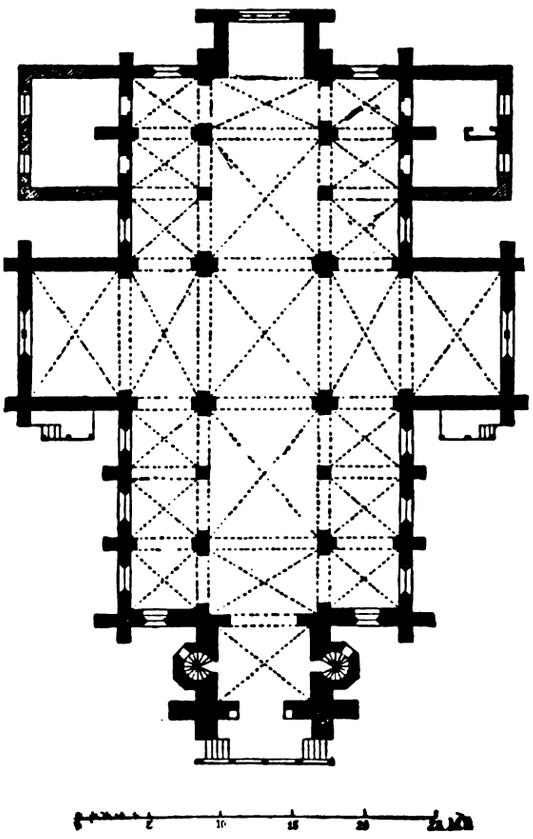

Fig. 146.

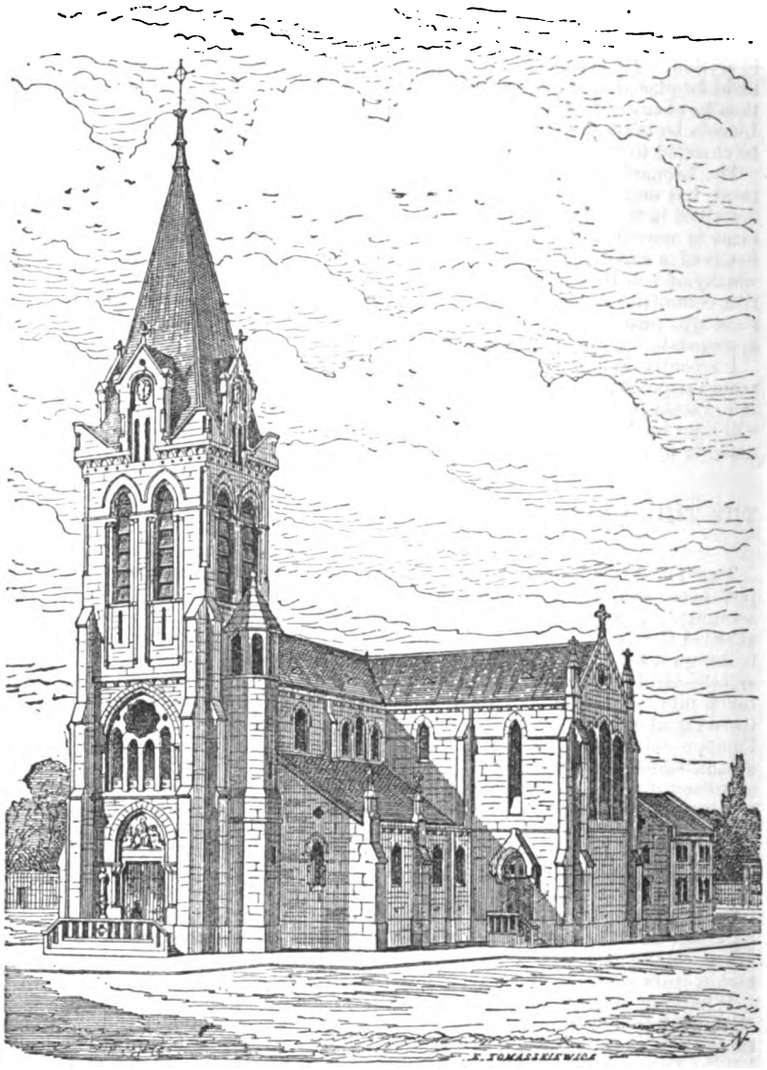

Fig. 148.

giving additional strength to those of the transept, and placed against each side, support the wall arches. Large isolated windows give light to the narrow bays. In the wider bays of the transept, instead of a single window, a triple one has been made. These windows come down to the string-course above the arches of the side-aisles, but their upper part alone opens to the outer air. The lower portion gives light to a gallery, a kind of triforium, covered by the roofs of the side-aisles. Arches placed below these roofs, the timber-work of which is supported by them, sustain the thrust of the vaults of the nave.

The steeple is over the main entrance, and forms the great feature of the principal façade (fig. 148). It is divided into three stories, each treated in a different manner according to the purpose for which it is intended; first the porch, then the window belonging to the organ gallery, and above this the long narrow windows of the belfry, over which is the base of the wooden spire. Triple windows resembling those of the nave give light to the transept; and there is a rose-window in the east wall of the chancel at the end of the building.

The materials to be employed are brick and white stone for the masonry, tiles for the roofs, and wood for the framework. Iron is not yet so much used in Germany as in France, and it is but seldom employed.

The person who planned the Catholic church at Hamburg, having a considerable space to cover, determined to give it a vaulted roof; it was in fact scarcely possible to cover a large surface by a ceiling. Metal is not well adapted for decoration under these circumstances, unless it is concealed by a covering of plastering, — a combination in every respect objectionable. Having therefore adopted a vaulted roof, the architect made the general plan and its details to correspond with it. The bays of the vault, as we have already said, are at right angles to each other, and are built of bricks without projecting ribs; as the angles are strengthened by a double brick, it is only necessary to make the large triangular bays about four and one-third inches in thickness. The spring of the vaults of the nave comes so low, and that of the side-aisles is, on the other hand, so high, that it allows flying buttresses to be formed in the roof of the aisles, supported by external buttresses, and intended to take the thrust of the vaults of the nave. This arrangement gives the side bays a somewhat heavy and clumsy appearance, but has the advantage of being truly economical in allowing the height of the nave to be diminished without rendering it dark, since it can be lighted by windows immediately above the roofs of the side-aisles.

The danger to be feared in such a case is lest the thrust of one of the smaller arches forming the division of the side-aisles should overturn the isolated pillar in the centre of the larger bay; but to obviate this difficulty it is easy to place over the springer of this arch an arrangement which would diffuse the thrust, throwing it not entirely on the column, but partly on the triangular mass of brickwork formed by the meeting of the two arches, which supports the solid part above the sill of the window; this would afford the necessary resistance. This system of vaulting appears therefore very simple and reasonable as to the points of support. Their disposition of the arches is not the result of caprice, but rendered necessary by the part which they have to play. The examination of the plan shows that their dimensions have been carefully adjusted so as to enable them to sustain the weight to be laid upon them; and these dimensions are increased at the top of the pillars by means of corbelling, intended to give greater surface to the imposts of the wall arches.

NOTES AND CLIPPINGS.

THE BOSTON POST-OFFICE. — The Supervising Architect of the Treasury has sent to the District Attorney in Boston the final order with reference to the purchase of the land for the site for the new Post-Office. Upon receipt of this, District Attorney Sanger will receive the title of the land for the United States, and the money will be paid over to the parties from whom the purchases are made.

AGGRESSIVE STRIKERS. — On the 10th inst. Edward Kilpatrick, a builder, complained at the Fifty-seventh Street Police Court, New York, that a number of his workingmen employed on a block of new buildings in Seventy-fifth Street were on a strike, and that they were intimidating those who had not joined them. One of the strikers was arrested as a warning to the others, and was committed for trial in default of $300 bail.

BRICKLAYERS' WAGES. — The Brooklyn Bricklayers' Union gave notice on Saturday last to their members, that the lowest rate of wages will be $2.50 a day. Any member who is known to be working for less will be expelled from the Union.

AN INJURED BRONZE STATUE. — It has been discovered that the right hind leg of the bronze horse on which Gen. Washington's effigy is mounted, on the Capitol Square, Richmond, is cracked for a length of twelve or more inches. The weight of the statue and horse is probably ten tons, and rests on one hind and one fore leg: the injured limb is the one poised. It is supposed that the crack was caused by the freezing, during the past winter, of water which by some means percolated into the casting.

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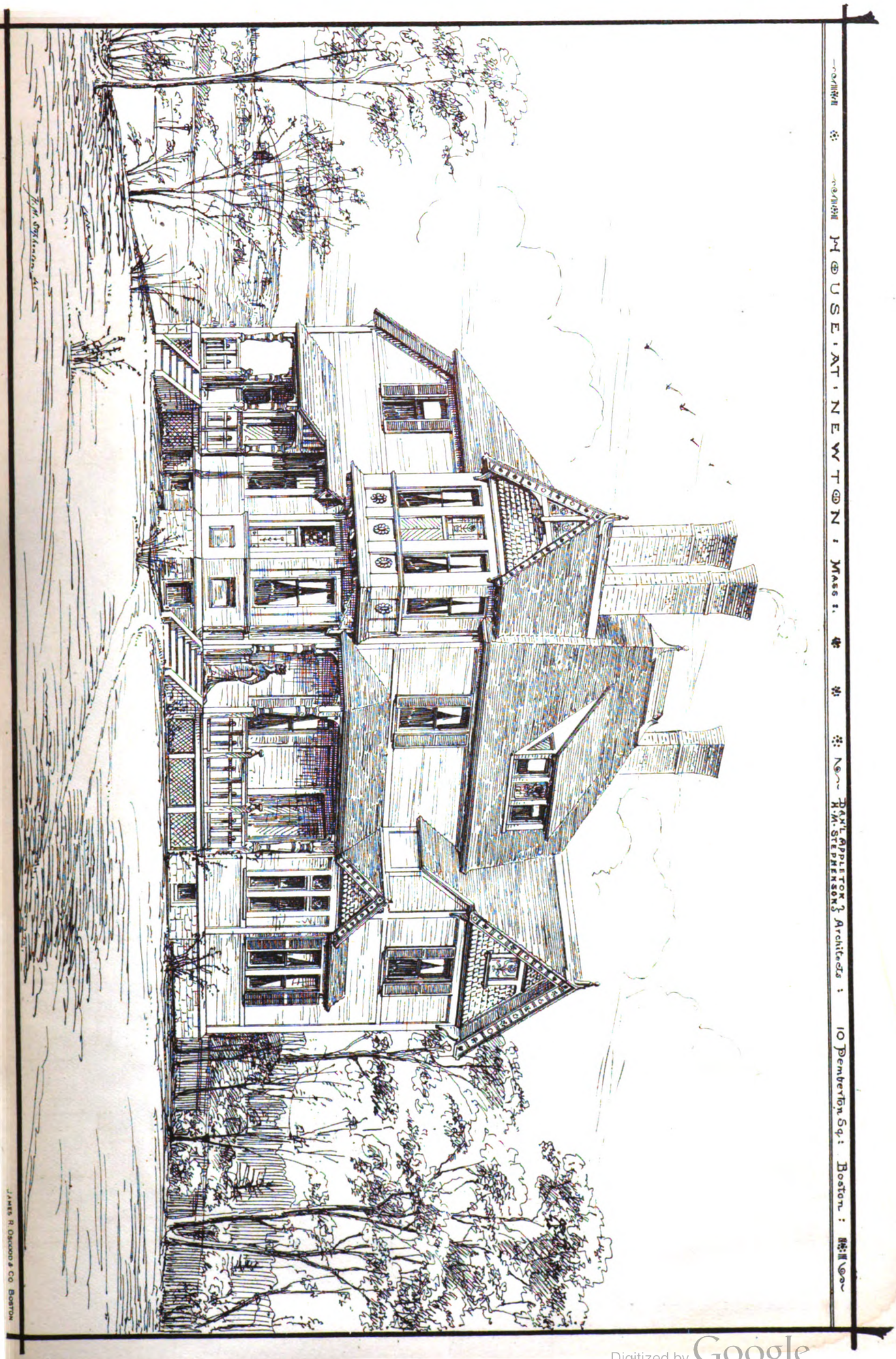

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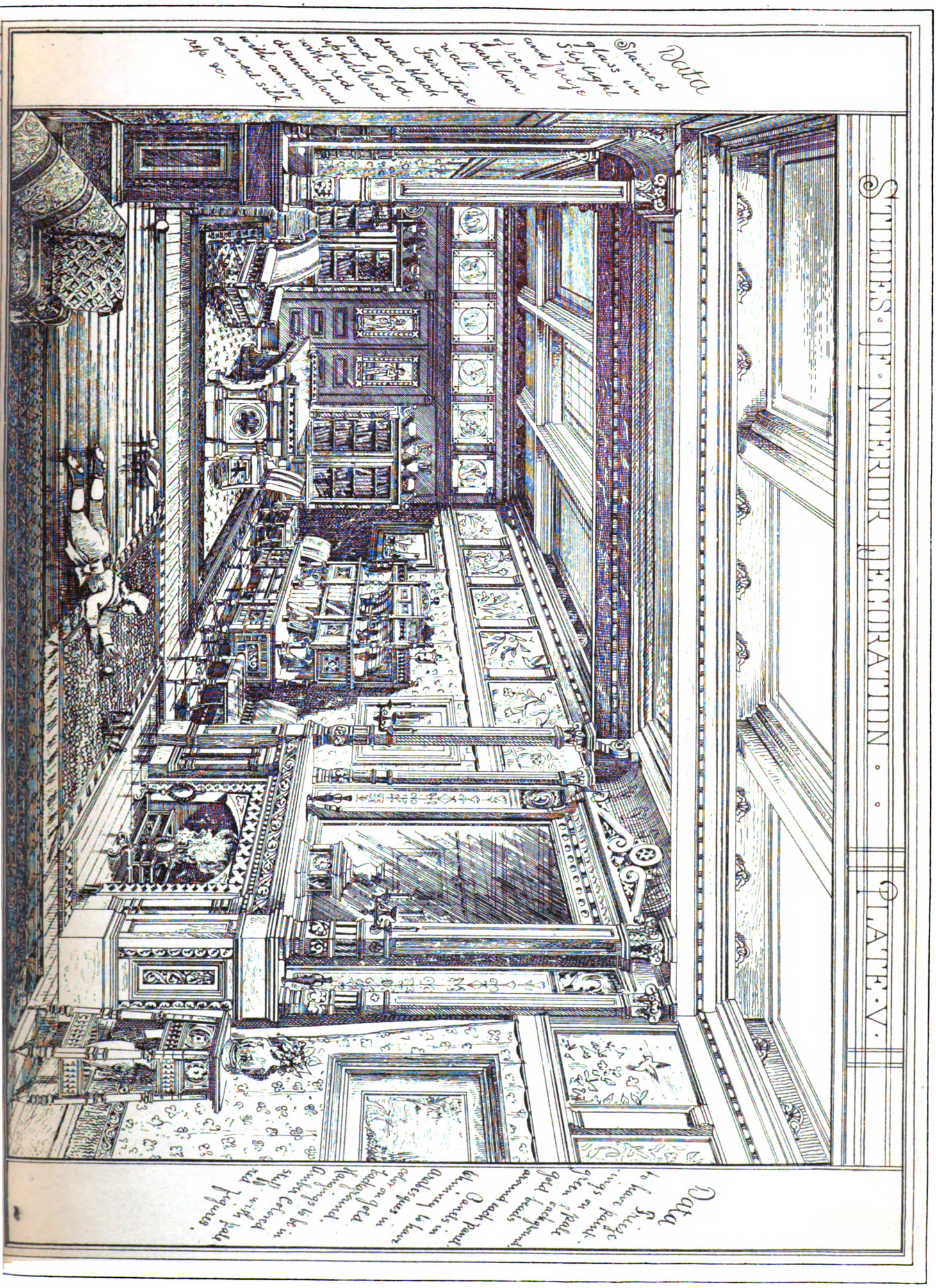

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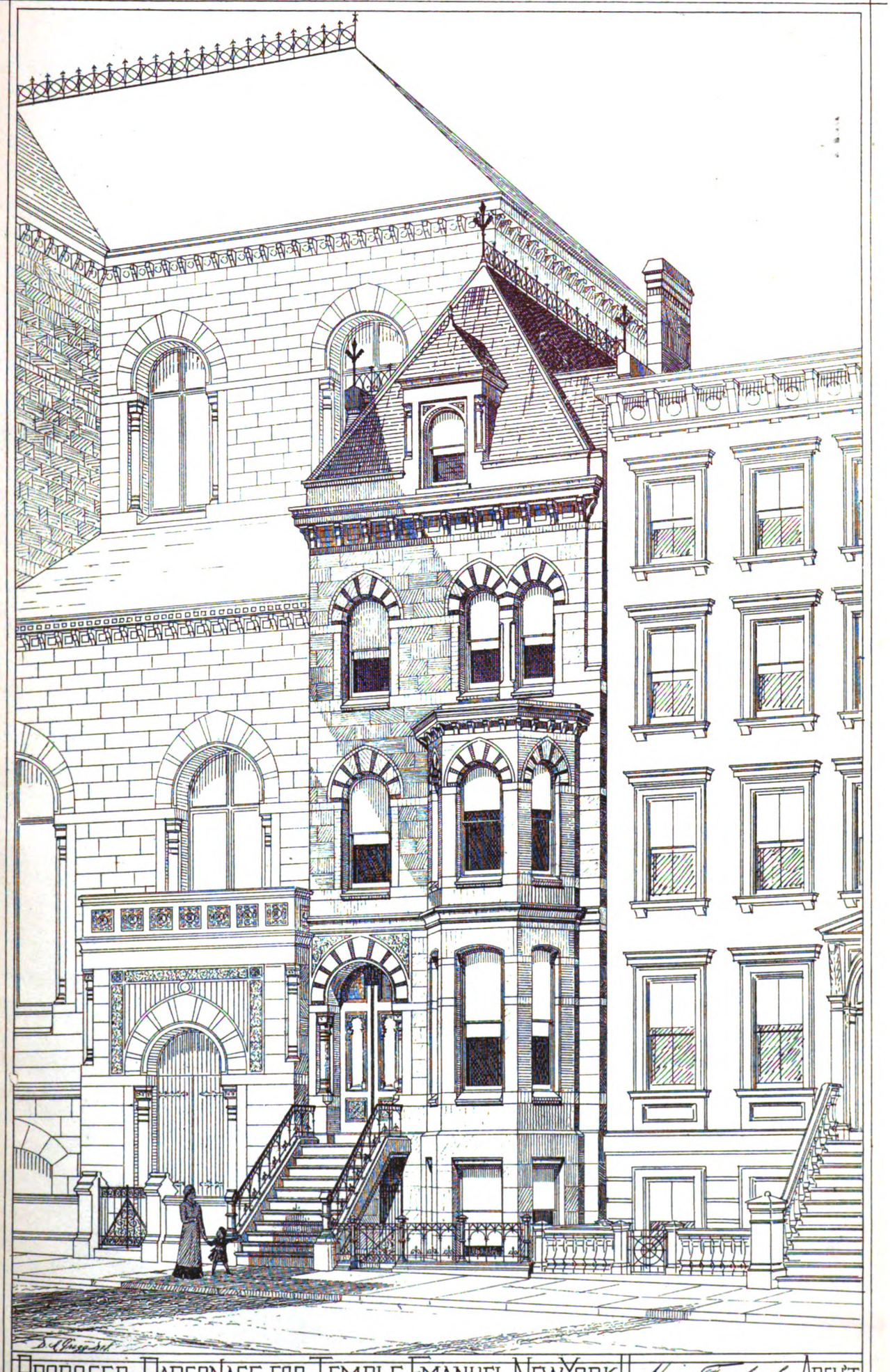

PROPOSED PARSONAGE FOR TEMPLE EMANUEL, NEW YORK. | Henry Fernbach, ARCH'T.

HELIOTYPE

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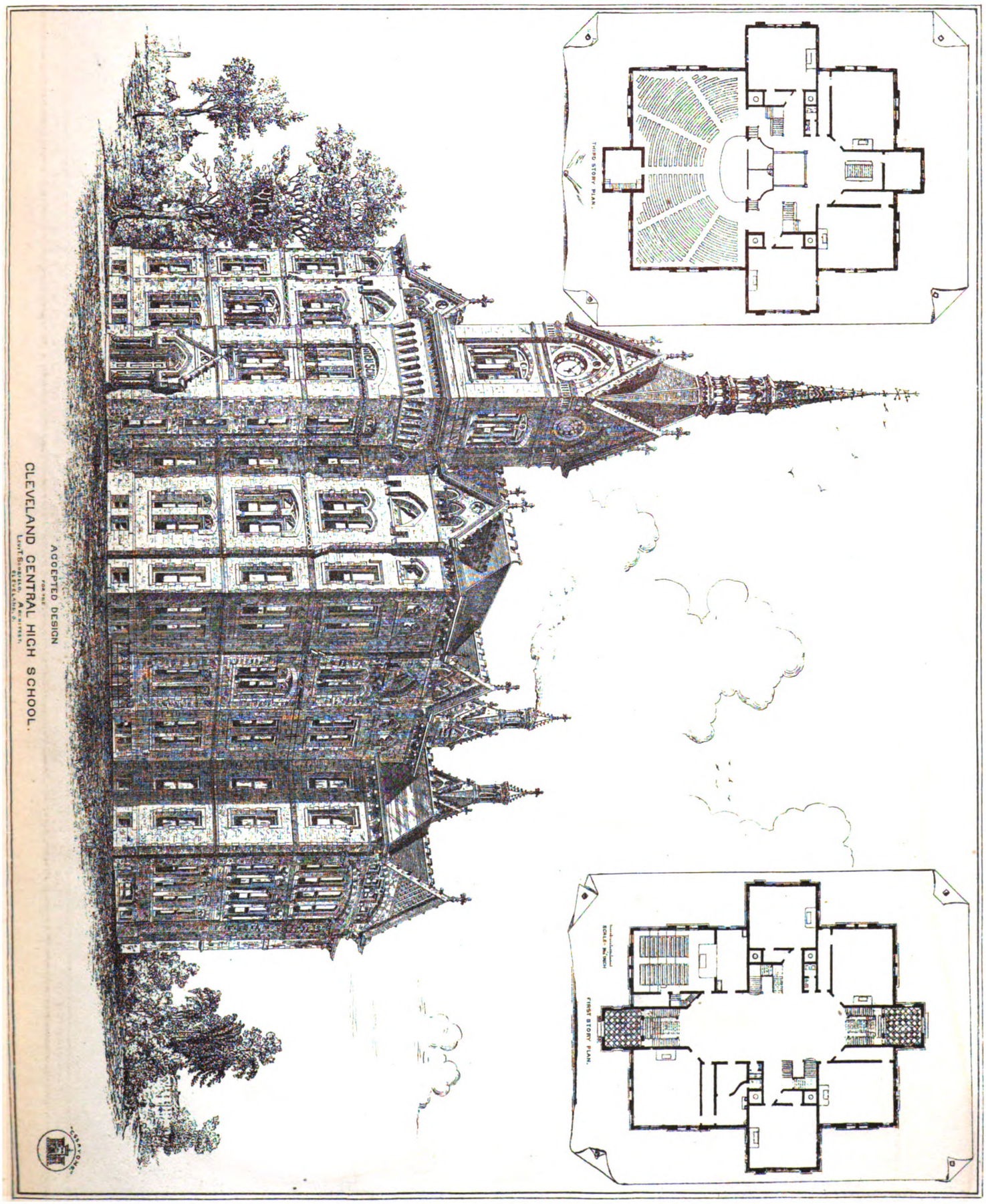

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, APRIL 28, 1877.

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WE see notices of resolutions and orders passed by the authorities of various cities, which require hotel-keepers to provide their houses with proper appliances for the extinguishment of fire, and for the relief of their guests who may be exposed to danger by it. The fire commissioners of New York have required the managers of all hotels, theatres, and other places where people assemble, to furnish them with suitable fire-alarms and apparatus. Attention has been called to a law in Wisconsin, which orders that innkeepers shall furnish all the rooms above the third stories of their hotels with ladders of rope or chain, "in order to facilitate the means of egress from such room or apartment by the occupants thereof." It is on record however, that the Southern Hotel was provided with hydrants and hose, which no one thought of using, although the people in it had the warning of a fire which had occurred in the building a week before. As for the Wisconsin law, we should think it would be small comfort to a remote lodger in a hotel some dark night, to reflect that all his unknown neighbors had rope-ladders to their windows; nor should we think the hotel-keepers would show great alacrity in "facilitating the means of egress" of Tom, Dick and Harry unwatched. Nor, in fine, do we consider it a decent condition of things which requires a statutory provision for facilitating the egress of women and children by night from fourth and fifth story windows on rope-ladders. It is to be hoped that no uncertain palliatives will be allowed to divert the public attention from the need of careful building, or take the place of such care in planning and constructing as shall make hotels reasonably difficult to burn, and reasonably easy to get out of if they do burn. We are glad to be told that in one large city at least, there is an effort stirring to provide for this matter in a building-law.

WE have received from an unknown correspondent a letter which we should have been glad to publish if the writer had conformed to our necessary rule by sending us his name and address. He tells the familiar story of a competition in which by invitation he submitted two successive studies. They were returned to him without the smallest acknowledgment or thanks for favors rendered. The truth is probably that committees or individuals to whom designs are submitted in competition do not give any thanks for them, simply because it never enters their heads that thanks are due. They do not conceive that the competing architects do them any favor; they are more apt to think that in inviting or permitting an architect to compete, they are doing him the favor, assuming that the possible chance of getting work is an advantage in return for which he is glad to give his time and money; and they no more feel themselves under obligations than they do for the advertising samples that are left with them by drummers.

WE do not see that any one can be complained of for this view but the architects themselves. It is not courteous, but the tendency of business is against courtesy. Architects know very well that the advantage to the client is great, and to themselves small; but the aleatory nature of the transaction entices them, and they gamble. It does not, as they acknowledge, encourage their self-respect, and of course not the respect of other people. Some architects set their faces against it, but there are enough left to establish the habit. They not only consent, but beg permission, to offer drawings in competition; and they spend more labor and money than is required upon them, making them needlessly elaborate, in the hope to outshine their competitors. It is not strange then that committees, seeing this eagerness, should think they have favors to bestow, and even conclude that the burden of obligation is on the architects' side. Architects can set the matter right whenever they are willing to exercise sufficient self-restraint; till then they have only themselves to blame. Considering the immense amount of work they spend in competitions, nine-tenths of which is entirely thrown away, it is worth their while to consider the sensible words with which our correspondent concludes his letter: "On whatever basis professional men take their stand, the individual members will soon find their level. If the basis is that of incessant competition, it will be sad for that profession both as regards its own pocket, and the respect of the world; but in final success and standing the result will still be the same."

IT is said that the Secretary of the Treasury has determined to divide the onerous duties which now fall upon the Supervising Architect, appointing an architect who shall be charged simply with the designing of the buildings which are built under care of the office, and leaving the functions of the Supervising Architect to be merely administrative. We are told that Mr. Hill will retain his place as Supervising Architect, and that the position of designing architect has been offered to Mr. James K. Wilson of Cincinnati. Mr. Wilson's ability as an artist and designer is well known among his brother architects; and if the duties of the office are to be assigned in the way that we have mentioned, they will be glad that the Government secures so capable a man for the new position. We do not believe, however, that such a division is the best escape from the difficulties of the present position. The real trouble with the Supervising Architect's office, architecturally speaking, has been that it gave one man a great deal more designing to do than he could possibly do his best with, even if he had nothing else to do; and unless the work of the office is to be greatly diminished, this difficulty will not be removed by giving him nothing else to do. The remedy proposed by Mr. Potter and Mr. Hill in the last two reports from the office, of dividing the work among a number of local architects, is the only reasonable one. These local architects might be selected in a variety of ways. They might be chosen in competition; or they might hold permanent government appointments like the departmental architects in France, or temporary appointments established where there was need of their services. In the present political condition of the country there is not much to be said in favor of increasing the number of permanent appointments, and even temporary ones might be only an embarrassment to the Government. A well-administered system of competitions would probably be the most helpful to the national architecture, and most beneficial to the Government, which, with the immense amount of work it has to do, ought surely to command the services of more than one able architect.

APROPOS of putting out fires, we are reminded that a Frenchman, M. Ambroise Pétry, has hit upon an ingenious device for applying the remedy at the right point in case of theatre fires. Considering that such fires usually take from the gas-lights, he proposes to make a connection between the gas-piping and water-piping of theatres, so that when fire takes, the gas can be turned off, and the water, being turned on simultaneously, would find its way directly to the point where the gas had set the fire. The obvious objections are that the water would find its way also to points where it was not wanted, and that gas might be extinguished where it was

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wanted, difficulties which would be but partially overcome by dividing the pipes into independent sections, while the quantity of water delivered through the gas-burners could be but very small.

A WESTERN paper gives accounts of discoveries made in excavating mounds in Utah, some of which are more significant and surprising archæologically than any that we have yet seen recorded. In one of the mounds were found last year skeletons of a man and woman, — the man six and a half feet high, and holding in his right hand a weapon of iron which was eaten with rust so that it crumbled to pieces. At the head of the woman's skeleton was found a carved tombstone; and in a tight box or receptacle of hard concrete near by was a small amount of wheat-kernels, most of which fell into powder on being exposed to the air, though a few grains in the centre of the heap retained their form, and when they were subsequently planted grew and produced a kind of wheat unlike any known in the neighborhood. Houses were found in the mounds, with plastered chambers in good preservation, some white, some red; pottery and cooking-utensils, and bits of curiously carved cedar, millstones, clay moulds as if for casting, and needles made of deer's horns. On one large vase of stoneware was a recognizable outline of the mountains in the neighborhood. A suspiciously modern air is given to the account by the statements that there were found many pieces of "crockery" similar in pattern to what is now in use, and well-shaped lasts, — of stone, to be sure, — and that the stem of a large pipe was between the teeth of the male skeleton.

THE Royal Institute of British Architects has for some time been considering the necessity of making some changes in its working. A Committee for the Improvement of the Institute was appointed a while ago, and we find an account of its report in a late number of the *Architect*. The Institute is established upon a royal charter, which prescribes the form of its organization. There was, we believe, some talk of getting a new charter; but to procure a charter requires an expenditure of several hundreds of dollars, and for this reason or for others a less extended scheme of reform is proposed. With regard to the standard of membership, the committee recommend that in order to better test the qualifications of candidates, all associates shall pass a professional examination before their election. This provision, however, is not to be put in force for five years. The rules of election have been somewhat relaxed of late years, and the committee propose a return to the earlier custom by which four-fifths of the votes cast were needed to elect a member. It is also proposed that a new class of members shall be established called Honorary Associates, who may be artists, archæologists, or amateurs, but who are not to be connected with any of the building-trades. There have been hitherto certain differences in the standing or membership of the city and the provincial members, which have given the Institute the character of a metropolitan rather than of a national association: these differences it is proposed to abolish, with the suggestion — which to an uninformed outsider has a little the ring of *naïveté* — that "it is unadvisable, and indeed disrespectful to the provincial members, that they should remain on a different footing from their metropolitan brethren as to their financial support of the Institute." Therefore it is proposed to raise their fees to an equality.

A SUGGESTION has been made more than once for the fusion of the Institute and the Architectural Association, a plan which has, we believe, met more or less favor among the members of the Association who are also members of the Institute, but has been resisted by the independent members, and is declared by the committee to be at present neither practicable nor advisable. Some suggestions are offered, however, for more intimate communication with the various architectural societies, of which several exist in the kingdom, — in Scotland and Ireland, and in the provincial towns of England, — although it is not thought that any system of affiliation which has yet been suggested would be desirable. It may be presumed that the Institute would not be willing to waive supremacy, and that the other societies would object to taking the position, against which indeed members of the Architectural Association have distinctly protested, of subordinate sections in the general body. It is recommended that as much encouragement as possible should be given to the use of the Institute library by those who are entitled to it, and that the hours during which it shall be kept open be extended; and on the other hand, "that all possible encouragement should be given to the Association in its educational work, and that the Institute, which has never charged itself with similar functions, should no longer retain a class of students which for many years has been merely a nominal one, and the existence of which conveys a wrong impression."

FIRES IN HOTELS.

A GOOD many of our cities are providing themselves with building-laws or revising their old ones, and the burning of the Southern Hotel is an admonition to take some care for the security of a class of buildings which have received little attention thus far. Such attention has become necessary. In the planning and construction of our hotels, care is given to almost every exigency except security against fire. This is neglected, not because it is not as necessary as other things that are provided for, but because there is no profit in it. Our people are willing to pay largely for luxury and splendor, but not for security, unless when imminent danger warns them. Under these circumstances we need hardly expect that either "*caupones maligni*" — or even *benigni* — or their proprietors will spend any more money than the rates of insurance compel in guarding their hotels against fire; nor any more than acknowledged decency requires in guarding their guests, which is a very different thing from the other. Nor need we expect that the public, except as they are warned from time to time by severe disasters, will be much influenced in their choice of hotels by considerations of safety. They will be attracted by convenience and luxury, and if they are true sons of the soil, by bigness, and will take security for granted. Of course the one efficacious and reasonable precaution before all is to build hotels that will not burn, as is done in Europe. The natural objection is that it will not pay. It is found, however, to pay elsewhere; and there is no doubt that if it were made the rule in any city it would be found to pay, though a fire-proof hotel weighted with competition with others that were not so might not pay. There are, it is true, special obstacles in the way of making hotels fire-proof, in that they require very large rooms on the lower floors, and small ones in the upper; and this means unsupported partitions and floors of wide span, which greatly increase the difficulty of using incombustible and heavy material. The difficulty is not invincible, however; and even by distributing the partitions of a building among incombustible cells, through which fire is not easily communicated, a very great gain in security may be had.

But if we are not yet ready to pass laws which require the absolute incombustibility of hotels, certain precautions suggest themselves as the minima of those that should be insisted on. A great part of the danger of our buildings comes from the fact that walls and floors are full of hollow spaces, lined with inflammable material and ready to lead fire unseen through the length and height of them. The floors are a series of wooden tubes a foot square or so; the partitions are honeycombed with air-spaces between the studs, imperfectly closed, and sometimes not at all, at the floors; and when the walls are furred upon masonry the hollow spaces are apt to run continuously from cellar to roof. It is no wonder that among such a labyrinth of passages fire is as hard to trace as vermin. Precautions against this are easy, and there is no reason for not enforcing them. The flues in the floors may be broken at every bearing and every "bridging" by a pugging of plaster between boards, or some equivalent protection. Those in the partitions should be cut off at each floor by a course or two of bricks and mortar, and again by a cross bridging also backed by a bed of mortar, once or twice in each story. Similar care would interrupt the flues behind the plastering of outside and party walls. If this system were thoroughly carried out, — it is a matter of very trifling expense, — and were supplemented by cross partitions of brick, it would make a building which fire could not traverse unseen for any distance, and in which it could not burn

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long without eating its way out and declaring itself. The spreading of fire in closed spaces is the source of a special danger, since a fire of considerable extent burning with little access of air produces a great quantity of dense smoke, which is almost as perilous to the people in a building as fire itself.

But beyond checking this inducement to the spread of fire, something ought to be insisted on in the way of actual fire-proof construction. The stairs at least ought always to be such, and in wells of brick which the flames cannot injure. These should be so enclosed, and the neighboring constructions around them fire-proofed for such a distance that there is no chance of flames being drawn into them, at least until the building is on fire to such a degree that men cannot be alive in it. There should be enough of such stairways. They might not be monumental; but if a grand staircase were wanted as a decorative feature, it should supplement them, not supplant. The elevators which are now thought indispensable in large hotels are in more ways than one a serious source of danger. They are of course of no use for escape in emergencies; they disaccustom people to the stairs; they make open wells which serve as combustible chimneys to distribute the flames through a whole building with the greatest rapidity. Elevators will increase rather than diminish in number; and it is therefore important to guard as far as may be against the abuses to which they lead, by insisting that they shall not reduce the provision of staircases, and that like the stairs they shall be incombustible, set in fire-proof wells, and at least so insulated by fire-proof surroundings from the combustible parts of the hotels, that they cannot be communicators of fire. As for their draught, it would probably prove hopelessly inconvenient to close the wells by traps at the various stories, but it is possible that this enemy may be turned to some advantage. If the brick walls of the well were carried above the roof, an ample ventilator at the top might make the well serviceable in giving a vent for the dangerous smoke, the useless car being dropped to the bottom and the ventilator open.

There are certain parts also of hotels as of other buildings, where special dangers are to be looked for; as store-rooms where matches, light fuel, and other inflammable stores are kept; the neighborhood of the cooking and heating apparatus or of the gas-meter. These places at least should be fire-proof, and since they are usually in the basement it is not too much to require that basement partitions and the ground floors of all hotels shall be fire-proof. This alone would cut off a great deal of danger; and, large spans not being necessary in the lower floors, and these floors, often laid with marble, being necessarily heavy and expensive, it would not be a great burden to have to make them of fire-proof material.

A great gain to the safety of travellers might be secured if the planning of hotels were under careful surveillance. In their arrangement certain considerations are influential that offer peculiar difficulties. One of the special requirements of a hotel is a constant supervision; and this supervision, which is one of the defences of the guests, makes it desirable to have but few exits. As a fact few hotels are provided with more than two, or at most three, that are accessible to the public; and of these commonly only one is ample and conspicuous. Happily, hotels are not liable to be swallowed up in flames in a moment, as theatres are; and if there are means enough for getting the inmates safely down stairs, two or three exits which are easy to find and not dangerously near together will probably be enough for the guests when they have once descended. But the intricate corridors and remote staircases which are common ought to be amended. It is perhaps not too much to demand that at every angle in the corridors there should be a staircase, fire-proofed as we have described; and from each room there ought to be a speedy access to at least two. They should be continuous to the lower story, and lead readily to the exits. For the danger that people will neglect the stairs and not know where to find them in haste, there is no remedy except in placing them as conspicuously as may be; but if we could say a word to travellers, we should suggest that if they use elevators to go up, they should accustom themselves to go down by the stairs, and become used to their position. The building of hotels of enormous height is one of the great dangers, and it would be fair to restrict this rigorously by requiring all that had more than three stories of rooms to be fire-proofed throughout. There ought also to be the greatest freedom of ventilation in the corridors, and exterior windows as well, for the smoke even when it is not suffocating is so bewildering that the stagnation of it is more to be dreaded than the possible fanning of the flames.

It has been argued that hotels should be provided with exterior balconies in each story. These might often give a chance for rescue, as was shown at St. Louis; but it would be necessary for their usefulness that they should be accessible from all the rooms. In the labyrinthine hotels of the day they would often be as hard to find as the stairs, besides which they are open to the serious objection that they offer too great conveniences to night-thieves. Fire-escapes are another kind of make-shift, on which too great dependence should not be placed. The New York *Evening Post* quotes from Superintendent Adams mention of one he saw in Chicago, — a loaded endless chain to which men clung, descending by their own weight; a contrivance which might be serviceable to a few cool people, but which, used by an alarmed crowd, would be extremely perilous, we should think.

The other precautions of fire-brigades, hose, and appliances for extinguishing fire, will suggest themselves to every one, and many greater or lesser devices to ward off invited danger will be brought forward; but it is of no use to put our trust in them, and turn our attention away from safe planning and construction. Proprietors will study the capacity, convenient administration, and economy of their hotels, and such other things only as catch the eye and attract the patronage of the travelling public. The travellers themselves will have a keen eye to their comfort and enjoyment, but a dull one to their security. It remains for legislators to protect them by insisting on a reform in the dangerous building of hotels. To lay down abstract rules which should sufficiently cover the difficulties of arrangement without unreasonable restrictions would, it is true, be found extremely difficult; and here the remedy lies mostly in the supervision of efficient and capable public officers.

STUDIES OF INTERIOR DECORATION.

VII.

Referring our readers to the plan of a city house in Plate IV. of this series, we desire first to point out the considerations which led to the constructional form of the dining-room in that plan; second, to ascertain the leading local conditions which must control us in completing this room, and in preparing it for occupation — or in other words, to develop a rational theory for its decoration; and third, to present one of the conclusions which are possible from the premises thus deduced.

We find we have space available for a dining-room sixteen by twenty-two feet, with windows looking toward the south at the end of the room; in the centre of the opposite end is the double door communicating with the parlor, and over it the frieze of stained glass by which some of the south light is borrowed to illuminate and decorate the darker end of that room, as arranged in our preceding paper. The chimney-piece is in the centre of one of the long sides. These dispositions invite the architect to complete the plan of this apartment in harmony with the sentiment of formality which they suggest, so that the eye of the observer may be gratified with an appearance of symmetry or order, each part being essential to the whole, and no feature of construction being accidental or misplaced. In fact, the plan seems to adapt itself to the artificial and conventional conditions of city life, as the same room in a country house, with its windows probably on several sides, each one important not only for light within, but view without, with its doors arranged more for convenience than for order, with its large and irregular boundaries, is fitted for country comfort and *dishabille*. To this end therefore we adjust the necessary appendages of service-stairs and butler's pantry, as well as the approach from the hall, so that the doors may exactly balance one another without straining the convenience of the plan, and the sideboard, the natural *pendant* to the opposite chimney-piece, may be thrown into a recess, thus preventing the room from being cramped in its width, and affording ample space, notwithstanding the projection of the chimney, for the service around the table. In fact, apart from the obvious considerations of comfort, space is an element of architectural effect so important that the architect can devise no detail elegant enough to compensate for its absence. In apartments of ceremony especially, it is his first business to obtain either absolute largeness of area or the appearance of it. Towards this end also, in the present case, a wide square bay-window is projected from the south wall, thus not only adding materially to the space, but affording light in greater quantity and duration than could be obtained by two windows in the flat wall.

These studies relate to the structure of the room. We are now

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to form a consistent theory for its decoration or completion. The architectural plan presents two long parallel sides, each symmetrically arranged; and we are to bear in mind that midway between them is to be placed an important piece of furniture, the dining-table, in which the proportion of length is distinctly predominant. We have thus three parallel features, all combined having a tendency to unduly increase the apparent length of the apartment, especially as presented on the occasion of the ceremonious entry from the drawing-room, when the long table is made longer, and set forth in a brilliant perspective of light and color. Now, as we took occasion to state in regard to the drawing-room, it is important to provide for this first impression. If we can so treat this room that its harmony of proportions is at once recognized and its essential relations of parts at once understood on entering, each of its main features appearing in its proper place, an effect of dignity is secured at the outset, and the battle is already more than half gained; the rest of the success is made up of details and of secondary features, which will in turn present themselves to the eye and play their subordinate part in giving to the most unobservant guest a feeling that the place is complete and fit for its purpose, — a sense of unity, in fact, which is hardly less enjoyable, even if he cannot quite account for it. It is the indefinable grace of art added to the hospitality of the feast.

This undue emphasis of the element of length is therefore the first error we have to correct in our study of decoration; and the means of this correction, as in the hall, is to counteract it by drawing attention to the element of width. The leading features on each of the long side walls must be so disposed and divided, if possible, that they shall respectively have distinct relations with corresponding features on the opposite wall; and the evident means of establishing and defining these relations, as our room is sufficiently lofty, are transverse ceiling beams resting upon the dividing pilasters, as shown by dotted lines on the plan. Two of these beams coincide with the trimmer beams of the chimney in the floor above. The room, in short, is thus crossed by comparatively narrow bays. Here is a distinct and legitimate *motif* of composition suggested by considerations of proportion and excused by the actual structure of the room itself.

Another detail of construction is the glass frieze in the partition between the two rooms. This suggests and almost compels the continuation of its lines on the walls, wherever possible, in order to bind the ends and sides of the room together and assist in establishing a condition of unity and interdependence. Our stained glass frieze on the partition between the two rooms is, on the dark side of the partition, a brilliant translucent mosaic; on the illuminated side, a dull and comparatively meaningless mass of slightly contrasting and irregular surface, cut up by lead lines. These lead lines and the border-lines we propose to gild on both sides to convert them into a feature of decoration. The glass frieze in the usual conditions of the light is bright on the drawing-room side, and dark on the dining-room side. In the former the wall frieze, which is continuous with the glass frieze, is therefore, for the sake of unity and to accord with the idea of brightness and gayety which we desire to express there, kept light; in the latter, for similar reasons and for the sake of a contrast of effect, it is kept dark.

But a dark frieze must overweight the wall of which it forms a feature, unless it is balanced by a dark dado at the bottom with an intermediate screen of lighter tone. The walls of our dining-room are thus divided into three horizontal belts, which should be of unequal values in width and color. Equality in these respects would be simply mathematical or mechanical. Harmony, as presented to the ear, demands a contrast of tones; as presented to the eye, there must be a contrast of spaces and colors. No two horizontal spaces or belts should be equal on a wall, and no group of mouldings should be composed of equal members: without a just subordination of parts, we may have good workmanship, but we cannot have good art. On the contrary, as regards the vertical divisions of a wall surface, the requirements of structure as well as of architectural effect frequently compel an exact repetition of parts. The larger the room, the more absolute becomes the necessity for such repetitions, as in the regular bays of a great hall, the dimensions of which are dictated by the necessary equal spacing of the wall-piers and of the roof-trusses which they support. The expression of order and dignity thus obtained is recognized in monumental work, and in general the regular recurrence of similar vertical divisions is associated with the highest efforts of architecture. It affords, perhaps, the most striking contrast between nature and art, — between the creations of the first and of the second order. But in smaller rooms, such as we are now considering, the equal division of a wall by vertical architectural lines is not required by its structure, is inconsistent with its uses, is too formal and stately for comfort, and interferes with the convenient distribution of its furniture. It may be, and often is, acceptable in a corridor, but in a living-room it would be oppressive and intolerable. Hence the irregular but symmetrical vertical division of our long dining-room walls by pilasters.

But whether in monumental or domestic work, whether on the outside or the inside of a building, an equal horizontal division by architectural lines is barbarous. This we regard as a fundamental principle of design.

Now, in adjusting the horizontal divisions of our walls, in the case in hand, we find the width of the frieze dictated by our conditions; the width of the other two members is a matter of feeling. The width of the dado should be distinctly greater than that of the frieze, in order to balance it properly, and either distinctly greater or distinctly less than the intermediate space. But in either event, one member must be plainly larger than the other two. The proportion may be as in fig. 1, in which the screen predominates; or as in fig. 2, in which the dado is superior. In

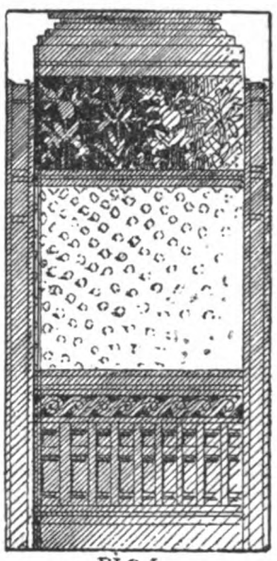

Fig. 1.

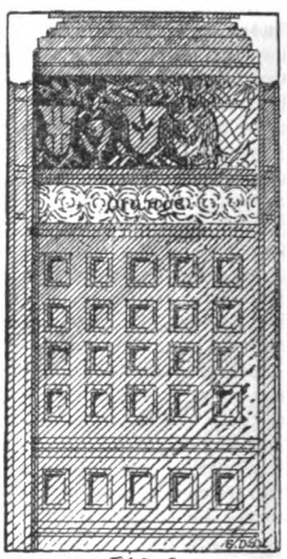

Fig. 2.

the latter case, the dado is to be treated as a panelled wainscot, and the screen, now reduced to a mere subordinate belt, should be more glowing and golden in color, in order to balance and justify the mass of sober wood-color below, and offset the vigorous dark treatment which we have recommended for the frieze. The narrower this central belt becomes, the more intense should be its color; for its function as a foil does not diminish with its size. All this argument proceeds on the basis that the wood is dark, — we assume it to be black walnut. If a lighter wood were used for the wainscot, the bright intermediate belt might be dispensed with; and in this case we must balance the frieze with a belt of ebonized wood, or of tiles, on the line of the chair-rail.

As regards the question of color and tone, we must ever bear in mind that the table, when spread with its white cloth, and set in array with the glitter of glass and silver, and the color of china and flowers, must suffer no competition of brightness on the walls. In the adjoining drawing-room the cold north light is beguiled by gay hangings, and its furniture of dead black and gold, its upholstery of amber and red damask, is set against a light background, shining and luxurious. In the dining-room, on the contrary, the whiteness and glitter of the table should be defined against a rich, dark background, and the warmth of the southern sunlight should be tempered by curtains of grave, neutral tones, enriched with trimmings of strong, bold colors. The æsthetic advantages of the opposition of tones thus obtained between these two rooms is sufficiently obvious. The open door between them, as seen from either side, should frame in a strongly contrasting picture.

These several considerations supply us with a logical theory for the decoration and completion of this room. Observing this theory with intelligence, we can hardly go greatly astray; and it seems to us not inconsistent with a reasonable degree of economy, or with an expenditure however luxurious.

We shall venture in our next pages to give an expression of the ideal which we have thus developed.

THE ILLUSTRATIONS.

HOUSE AT HOLYOKE, MASS. MR. H. F. KILBURN, ARCHITECT.

(229 Broadway, New York, N.Y.)

THIS drawing shows the house of the Hon. William Whiting in its original and in its altered condition.

ADDITION TO HOLT-AVERELL, COOPERSTOWN, N.Y. MR. H. M. CONGDON, ARCHITECT.

(111 Broadway, New York, N.Y.)

This illustration shows the alterations that have been made in the house of Mrs. J. R. Carter.

BANK AT NORTHAMPTON, MASS. MESSRS. FERRY AND GARDNER, ARCHITECTS.

(33½ Barnes Block, Springfield, Mass.)

These designs were presented in competition some months since.

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HOTEL BOYLSTON, BOSTON, MASS. MESSRS. CUMMINGS AND SEARS, ARCHITECTS.

(9 Pemberton Square, Boston, Mass.)

This bay of one of the oldest apartment-hotels in Boston was drawn by Mr. G. R. Shaw for the Portfolio Club.

BUILDING ON TREMONT STREET, BOSTON, MASS. MR. J. PH. RINN, ARCHITECT.

(27 Kilby Street, Boston, Mass.)

This store, built of marble and iron, is situated on Tremont Street, facing the Common.

AMERICAN INSTITUTE OF ARCHITECTS.

BOSTON CHAPTER.

THE regular monthly meeting of the Boston Society of Architects was held on Friday evening, the 6th April, at the Architectural rooms of the Institute of Technology. Nine members were present, the president, Mr. Cabot, in the chair. A number of students from the architectural department of the Institute were also present by invitation.

The Secretary read several communications received from the Secretary of the American Institute of Architects since the last meeting; after which the subject of the evening was taken up, being the new Trinity Church. Mr. Martin and Mr. Ware had been appointed to open the discussion, the former considering the construction and the latter the design of the building. In the absence of Mr. Martin, the President asked the Secretary to make any observations that had occurred to him concerning that branch of the subject.

The Secretary said he had not carefully considered the subject, and had nothing further to say than that the difficulties presented at the outset of the work by the unusual character of the design on the one hand, and the unsatisfactory bottom under the church on the other, and which had occasioned some uneasiness during the earlier portion of the work, appeared to have been successfully met and overcome. He was not aware of any failure or any apprehension of failure in the four supporting piers of the tower, or in the foundations or piling beneath them. The only feature connected with the construction that he was disposed to regret was the covering up of those great granite piers, and of the brick arches above them, by lath and plaster. So important and grand a piece of building furnished an opportunity for simplicity and strength of effect, which he was sorry to see thrown away.

Mr. Hartwell remarked upon the excellence of the arrangements for ventilation and warming, which had been planned and carried out by Mr. Tudor.

Mr. Peabody spoke of the use of lath and plaster for the walls as opposed to the practice in Europe, where a plastered wall in a church would be regarded as out of place. A church of so monumental a character as this should be treated so as to suffer as little as possible from the decay of such materials as plaster or water-colors.

Mr. Longfellow thought the plastered piers and arches of the central tower conveyed an impression of flimsiness, but that the walls might well enough have been plastered if the real piers and arches had been exhibited.

Mr. Van Brunt remarked that the absence of visible strength in the more important parts of the construction was objectionable in another point of view, as taking away all motive and starting-point for the elaborate decoration of walls and ceilings.

Mr. Longfellow said he would like to know something of the roof-framing. He was under the impression that the tie-beams shown connecting the cusps of the arches of the tower are not essential features in the construction, and he thought them disfiguring.

Mr. Ware took up the design of the building, and showed photographs of several churches in France and Spain, which may be presumed to have furnished to a certain extent the prototype of the church now under consideration. The towers at Zamora and Salamanca, and the apses of several churches in Auvergne, all present greater or less similarities in style and treatment. The principal thing to be noticed in Trinity Church is that it is not Gothic; that it contravenes directly all the fundamental dogmas on which the advocates of Gothic affirm its superiority to other styles. Of these dogmas, the first is that it is the special property of the pointed arch to express the ideas of solemnity, devotion, and aspiration. Here is a church with not a pointed arch in or about it, and which yet has a character of seriousness, solemnity, and serenity, which the pointed arch never attains. The Romanesque buildings heretofore built in this country, of which the building of the Smithsonian Institute at Washington is a fair example, have generally been deficient in dignity. But there are several fine church-towers in this neighborhood, built by Mr. Esty twenty or thirty years ago, the one at Cambridgeport being particularly noteworthy.

The second dogma respecting Gothic architecture — that the multiplication of parts increases the apparent size of an architectural work — the church flatly contradicts. The effect of size, and the impressiveness which comes of it, are, in fact, more readily obtained by few subdivisions, and these as large as possible. St. Peter's at Rome is an instance often adduced to prove the Gothic theory, nobody ever giving the church credit for its actual size; but whether one correctly estimates its dimensions or not, he is impressed by its bigness in a vastly higher degree than he would be were the arches of the nave increased in number and decreased in size. To take an example nearer home, the First Church in Boston owes what impressiveness of effect it has to the fact that its parts are few and large. It is the *scale* that tells. Trinity Church is not a large church, as churches go, but the scale is gigantic; and there are few buildings anywhere whose size is more imposing.

The third dogma that this church sets at defiance is that of "honesty;" the doctrine that the forms and materials relied upon for architectural effect should be those actually employed in the construction. Here, as in most public halls, the architecture of the interior is a screen of lath and plaster. Without undertaking now to discuss the practical arguments in favor of this, or the theoretical arguments against it, which would open a wide field of debate, it is sufficient to inquire whether, upon the theory adopted, the treatment is consistent and satisfactory. Here we find something to regret. The broken arches under the tower are obviously a mere shell or ceiling, and are properly enough thrown into forms impossible to stone. But the walls that are above them and the great piers below are designed as if for stone. If the lines of the great arches which really support the tower had been taken as the *motif* of the decorative treatment, it seems as if there would have been more unity of design. The unpainted wooden tie-beams also, which have an obtrusive air of constructive significance, seem out of keeping with the avowedly inconstructive composition of which they form a part.

Concerning the exterior it might be said that the tower is perhaps too big and too high, not in itself, but as an element in composition. In itself it is noble, and it has a dash and freedom about it more like old work than like modern work; the treatment of the transepts very happy; the carving admirable, though sometimes objected to as being partly conventional and partly naturalistic. The simplicity of the plan is remarkable; on paper it looks like nothing, — as if half a dozen lines expressed it all; the view of the whole church from every point within it is good, and the acoustic properties satisfactory.

Mr. Peabody cited as a contrasting example of these round-arched churches, a work of M. Vaudremer at Montrouge, in which the treatment presented a strong contrast to Mr. Richardson's methods. M. Vaudremer's work was studied with Greek nicety even to the minutest detail, while Mr. Richardson's work is often remarkable for a studied rudeness in the detailed work which we reprobate; and yet he seems thus to leave on his work a charm and interest, while as a whole that of M. Vaudremer is cold and forbidding.

Mr. Ware could not at all agree. If the bases had been as carefully studied as the capitals, we should have felt so much the more satisfaction in the work.

Mr. Longfellow thought Mr. Ware had placed the issue between the Gothic principle and its opposite, respecting the subdivision of parts, on a false basis. It is not solely a question of large or small subdivisions; but the effect of great size is gained by large and broad subdivisions, with small features associated with them to give the scale, as it were; the large features dominating, and their size made manifest by the small. This will account for the success in this respect of Trinity Church; and there is the difficulty with St. Peter's: there are no small parts.

He was glad to hear the transepts of Trinity Church well spoken of. This was the first word he had heard in their praise, but to himself they appeared masterly pieces of composition.

The discussion of Trinity Church ended here; and Mr. Peabody read a paper concerning the revival of the Queen Anne style, so called, which he said was inspired by a feeling that in the discussion on that subject at the February meeting, the value of that style and the importance and significance of the present movement in England were not done full justice to.

A TALK ABOUT "QUEEN ANNE."

[This is in the main the paper read at the April meeting of the Boston Society of Architects, and mentioned above.]

I DO not wish to be the champion of all the affectations of the Queen Anne school of design. I fully admit there are such, but I cannot agree with what I understood as the opinions expressed at a late meeting of the Society of Architects.

It then seemed to be held as a movement of no account, — a whim of a few people, and one that we need not interest ourselves about. Now it seems to me, on the contrary, a very decided movement and one of great importance to us. As a fact, whether fortunately so or not, what goes on in England in an art, as in many other matters, is to a certain extent quickly reflected here; and it is well from this point of view to follow closely the Queen Anne movement.

Some six years ago I had the friendship of a London architect, a Gothic designer, but even then an admirer of quaint bits in old

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farmhouses, furniture, and the like. Last winter I renewed the acquaintance, and at an early visit found him full of the beauties of some carved figures, Italian, — perhaps of Luca della Robbia's work, — which had been left with him as suggestions for a stained window. This hints at the change in that short time; one that is absolute and decisive in the English view of our art.

The history of the change is as hard to trace as that of any other inevitable wave. Mr. Norman Shaw passes for the chief light of the school; but he was a master in Gothic design before he made this departure. Now it is rather the English fashion for a man to affect some peculiarity of design, and carry it along as his trade-mark. Butterfield has striped Rugby and Keble College; Scott holds to historical precedents; Pearson's eminence is largely due to his having held constantly to Early English work, while Burges took on a French air, and Street had an Italian period. So perhaps Shaw found others could design Gothic work much as he could, and following this English fashion, perhaps he thought that he too must cut out a specialty in design for himself alone. At all events, from his Lyons Church or even Cragside, it is quite a step to Lowther Lodge and New Zealand Chambers; though through it all he still remains a master. But even in England a man does not retain possession of the style he has the audacity to revive, and so Shaw's works have been followed up by London Board Schools at every term, with cheerless interiors, and carved brick garlands and cornices on the outside; by Mr. Stevenson's houses of red brick, — one with a great blue vase in the centre of the front, as if to suggest the wealth of bric-à-brac stored within; by Brydon's cosey houses and studios, and Bodley's School Board building; while in country work nothing is in the latest mode, except it glows with red brick and red tile, and its posts are turned like those in the famous lodge at Regent's Park.

Of all this work the distinctive feature is beyond all its pleasant, homely, hospitable warm color, that should be backed up by the green of old English trees. This is what gives it its chief attraction, and what does not unfortunately reach our shores in the pages of *Architect* or *Building News*. Then its careful brickwork is to be noted, and the extraordinary affectation of cut brick; mouldings, carvings, garlands, all being cut in the bricks after they have become set in the wall. This is accounted much sharper than terra-cotta, and in fact the only worthy material in which to carve the mysterious pot of sunflowers. Again, its white frames and sashes near the face, giving deep interior recesses, its turned wooden posts, and any eccentricity in general design that one can suppose would have occurred to designers one hundred and fifty or two hundred years ago.

But perhaps the change came from within more than from without. Talbert's sideboards that used to be of the most stern mediæval aspect, and were not, I think, permitted a coat of any filling or finishing, now have lost their notches and chamfers and dog-tooth, and the lathe has taken the place of the adze and the hatchet and other rude weapons, while I do not know but French polish even is permitted where once the wear of many hands was held to be the only fit method of filling oak. Morris's papers and stuffs we all know — no gold, sombre neutral tints, while Japanese bric-à-brac, tiger-skins, blue china, screens, fans, Eastern rugs, all lend their aid in furnishing the rooms of to-day. If in architecture proper "Queen Anne" has made but a certain progress, in the less permanent arts connected with the interior its effect is almost universally seen. Go into the St. James Restaurant, an immense building with the front of a Venetian palace. The walls of its grill-room are all of tile or artificial marble, but decorated with all the gods and goddesses and heroes of profane mythology, while over the way in the Criterion is more mythology. You make a call, and find at the door a knocker, and only a knocker. A friend was designing a scene for the stage, — a hall with a great complicated Queen Anne staircase. At the theatre again was a scene with chimney-corner, settles, little window, and all that business complete, and a large collection of blue china in the cabinets. Somebody spoke of a blue-china enthusiast who had blue plates fastened all the way up the string of his stairs; while a collection of old warming-pans met a ready sale, their stamped covers forming excellent sconces. Dido, Helen, Sappho, and the like form subjects for Morris's glass. Tissot, the artist, whose pre-Raphaelite stiff pictures we remember, now gives you a quaint maiden in a Gainsborough hat, relieved against a small sash window, with the Thames beyond, and has moved his style forward a few hundred years. And so it goes through all interior decoration. The monks and saints and mediævalism are banished to the ritualistic churches, while elsewhere reign supreme gods and goddesses, Earthly Paradise and Chaucer and Old Kensington, sunflowers, sconces, blue china, turned work instead of notches and chamfers, and above all Japanese screens, fans, stuffs, papers, pictures, bronzes, china.

Such is the hold that this spirit in design has obtained in England. In our judgment of it we greatly err in calling it "Queen Anne," for that after all is but one little phase of a strong reaction. It certainly is not strictly Queen Anne, although some designers affect that period; nor Stuart, though as a reaction some of the furniture men have toned their enthusiasm for bed-posts and broomsticks with a study of the orders; nor is there very much hope of a return to Italian or any orderly methods in a style whose very freedom is the making of a great artist, and which in the hands of a "duffer" will make the public long for the days when nothing was thought of but the always refined orders. On the contrary, all this can only truly be thought of as the period of odds and ends, beauty in any form, cosiness, comfort, picturesqueness, — in short, the "bric-à-brac" style. Perhaps Thackeray had as much to do with it as Morris or Shaw or the furniture men. But no one can shut their eyes to it in London. Outside its red bricks are hid under no bushel, but bravely stare out in the midst of a row of "compo." fronts; while inside if not master it has sensibly influenced almost every thing.

Now all this bric-à-brac style may be a passing fashion; but even if Scott and Burges and Street and Butterfield go on designing as they did, yet still this other spirit is firmly rooted in England, and of importance to us. Certainly however there is more in it too than was referred to at the society meeting. I well remember how in the French *atelier* the students used to look at English work, — the Manchester Town Hall for instance, — very pretty and fine, but not architecture. On the other hand in England, although the Royal medal has been given to M. Duc through the vigorous exertions of a few men, yet it is not probable that the mass of English architects either then knew who he was or what he had done, or would have cared for it if they had, or if they visited the Palais de Justice would have seen any thing but the Sainte Chapelle or the Conciergerie towers. Now it can hardly be said that this feeling of partisanship has ever existed here, partly because as outsiders we could see the injustice of it, and partly because we have too little that is good to revile any of it. Whatever was good and beautiful and true, or any of them, we have been disposed to admire, whether its arches were pointed or its openings spanned by lintels. Is not this view now strengthened by the strongest of cases when these men are found selecting the most debased detail to work with, and yet doing the most fascinating work? In short, here we certainly seem to see that it hardly matters at all what tools a man works with, provided he understands his business and is an artist. It is probably still an heretical thing in England to say that a man can design both classical and Gothic work. Yet here we see Mr. Shaw varying his sources of inspiration very greatly, and yet always remaining a great artist; Mr. Bodley designing choice pointed churches, and the School Board Building on the Embankment; and while the noble group of the Palace of Westminster closes the vista of the Thames, it will with all its faults remain an almost unsurpassed record of skill in the same man that designed the best of the London club-houses, and generally passed for a classical designer. So here we find the Queen Anne vagaries indorsing our views far more probably than their English advocates would admit, or at all events would have admitted.

Mr. Longfellow's paper has lately told us, apropos of the muddled architecture at the New York Capitol, that if the doctors differ so much in regard to style or the fusion of styles, the public now caring little enough about it will shortly both despise styles and those that administer them. Now it is perfectly true that the public care about special styles very little indeed, and calmly take whatever is given them; but incongruity of style, on the contrary, I think they are as alive to as others; and certainly I agree with them that any special style is of the least possible moment, but that congruity is of the utmost desirability. In this position the public are interested and do care; and if my memory serves me, the principal opponents of the extraordinary things proposed at Albany came from the laymen to whom the architects only lent a ready aid.

Thus I have meant to show that this movement is very strong and well established in England, and consequently of importance to our designers; that bric-à-brac, and Japan, and India, and classic mythology, and odds and ends, inspire it quite as much as Queen Anne; and that after all it is a curious support to our American eclectic notions. But lastly to those who do believe in revivals, "Queen Anne" is a very fit importation into our offices. There is no revival so little of an affectation on our soil, as that of the beautiful work of the Colonial days. Its quiet dignity and quaintness, its cosiness and elegance, always attract us. It is our legitimate field for imitation, and we have much of it to study right in our own neighborhood. In fact, any one who in summer drives over the ancient turnpike from Hingham to Plymouth will not only pass through a beautiful country full of old homesteads, but will find the sunflowers still nodding behind the gambrel-roofed houses that line the road through Queen Anne's Corner.

R. S. P.

CORRESPONDENCE.

BURNING OF THE SOUTHERN HOTEL.

ST. LOUIS, April 14, 1877.

EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Although three days have passed since the tragic burning of the Southern Hotel in this city, no information has yet explained the apparent inefficiency and mismanagement of those to whose care was intrusted so much valuable life and property. At the time of writing it seems that the destruction of the building would hardly have been more swift and complete had our fire department not

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been in existence. It is to be hoped that the coroner's investigation may place this matter in a more favorable light.

The north front of the hotel occupied the entire block on Walnut Street, two hundred and seventy feet long. The east front on Fourth Street was one hundred and fourteen feet long, and the west front on Fifth Street was one hundred and twenty-five feet long. A south wing about forty feet wide ran through to Elm Street, two hundred and twenty-seven feet from Walnut Street. The entire building was six stories high above the pavement. The north, east, and south fronts were of Joliet limestone ashlar; numerous brick division walls ran up through all the stories, and the construction was of the most substantial character throughout. In evidence of this the three stone fronts yet stand unbroken from pavement to the top of the cornice, save a part of the east front, although every floor is burned through, and the entire inside has fallen into the cellar. The hotel was built during the war at a cost of some $1,250,000.

The fire is said to have originated in the store-room, which was in the basement adjoining the baggage-elevator and the grand stairway, and near the passenger-elevator and the ladies' stairway. A more dangerous place for a store-room would be hard to find. In it among other supplies were curled hair and *matches*, the powder and the spark. The engineer is reported as testifying that the matches used to be kept on a shelf, from which they sometimes would fall and ignite, and had recently been kept on the floor for this reason. This store-room, thus dangerously located and thus dangerously filled, is said to have been enclosed by a *board partition*.

Shortly after one o'clock on the morning of Wednesday, April 11, the office fire-alarm indicated fire in this quarter. At 1.23 A.M. the alarm was sent to the central station from the nearest street box. Why the office signal was not used, or whether there was any, does not appear. At 1.30, seven minutes later, the alarm was sent from the central station, but one block from the fire. A messenger could have traversed this distance half a dozen times in this interval. There was equal delay in reaching the fire and in getting to work. The chief of the fire department was ill, and did not come out till the second alarm. One of his deputies was likewise disabled, and a second lived two miles away. A Skinner Fire Escape was on hand, but was unaccountably slow in working. The fire soon reached the baggage-elevator, and mounting to the roof found vent; thence it burned downward through floor after floor till the building was destroyed. The halls and corridors were quickly filled with smoke from the openings on each story to the elevator, and the imprisoned guests were driven to the windows, whence many were rescued; but some were killed by falling or jumping to the pavement below. The night was a calm one, and the fire was confined to the hotel.

There was the usual provision of water-pipe and hose on the different floors, but there is no evidence of a single attempt to use them. The hotel officials seem to have left the task of arousing and rescuing the sleepers, some five hundred in number, chiefly to the volunteer efforts of those who happened to awake first, and who had the necessary presence of mind to go through the halls and give the alarm. Many acts of heroism in saving life were performed by firemen and citizens.

The coroner's investigation is to begin on Monday next, and there is a general expectation that blame will be found to rest somewhere, although there is talk of secret sessions. In the absence of proper legislation for such cases, it is doubtful if any punishment can be inflicted, whatever the coroner's verdict.

The most obvious lesson of this catastrophe is the imminent danger to life and property from a fire, however small, in a large hotel. When the Lindell Hotel burned in this city just ten years ago, the fire was discovered in the sixth story early in the evening, and without hinderance gradually worked its way downward through the entire building. Another often inculcated lesson is our pressing need of suitable legislation and efficient supervision of all public buildings in the interest of public safety, where individuals are powerless to protect themselves. Nothing but law rigidly enforced by capable officers sustained by public opinion will prevent the recurrence of similar disasters. Were one to inquire why any other hotel in this or other cities is not just as liable as the Southern to such a fatal conflagration, it would be difficult to find an answer. The same remark will apply to our theatres and other places of assembly. If it were possible to secure a competent and responsible officer charged with the duty of a monthly inspection of all public buildings, with reference to their safety against fire, and required to publish his report monthly in the daily papers, the public might at least be informed as to what precautions are most necessary, and where they are best observed. If this officer were required to close all dangerous premises, and to prosecute all derelict managers, under penalty to himself, the security would be enhanced.

The event teaches the necessity of making store-rooms fire-proof, and of keeping them away from all elevator shafts and stairways. They would most safely be located under a court, or otherwise, beyond the main building, and might be subdivided into small compartments with several electric annunciator plugs in the roof to each, supplemented by frequent inspection by a watchman. Elevator shafts and stairways might be non-inflammable, and fire and smoke proof doors should guard every opening to the former. Baggage-elevators might be external to the building. Were the gas-burners to every hall supplied from different risers an accident to one would not cut off all light. Two or more main stairs widely separated, iron balconies and fire-ladders to every story, brick division walls through every floor and running high above the roof, electric alarms in every room controlled at the office, and speaking-tube communication between the office and every part of the building, are additional precautions which naturally suggest themselves. A knotted half-inch rope in each room would probably have prevented the loss of a single life. In this respect the old-fashioned corded bedsteads would have been invaluable. A night watchman to each floor, specially charged with discovering fire and with saving life, might have conducted every sleeper safely from the building. It is understood that a law adapted to such cases as this is now before the State Legislature, and a vigorous attempt will be made to secure its passage.

CENTRAL PARK.

New York, April 16, 1877.

To the Editor of the American Architect and Building News.

Sir, — I find this evening in your issue of Saturday last, a note from Mr. Frederick Law Olmsted, calling in question the justice of some remarks of mine in the last annual address made before the Institute, as to the share of Mr. C. Vaux in the work of the Central Park.

Mr. Olmsted is perhaps the best judge of the share Mr. Vaux had in what is termed in the address "the æsthetical treatment of the grounds." But as to the "distinctively architectural works" of the Park, I beg to be allowed as an architect, and as an employé for some time on the architectural staff of the Central Park, to say that so far as a considerable portion of the twelve years he alludes to is concerned, Mr. Olmsted's last sentence is misleading, and "pointedly denies" to others than Mr. Vaux their "due professional record."

On the whole, I think I shall be doing justice to all parties in letting my paragraph about the Central Park stand just as it is; unless perhaps in assigning, on Mr. Olmsted's own authority, less of the credit for the landscape treatment to himself.

A. J. Bloor.

TRAPS.

Chicago, April 11, 1877.

To the Editor of the American Architect and Building News.

Dear Sir, — In your issue of Feb. 3, in the communication entitled "The Drainage of Country Houses," there is the following statement: "*I take the precaution to use traps which cannot lose their seals from any cause except evaporation.*" Will Mr. Bayles or some other correspondent inform the public where traps possessing this valuable property can be obtained?

It is well known that the traps almost universally used in plumbing, viz., tubes bent in the form of an $\mathcal{O}$, are very liable to lose their seals by being "siphoned out." Ventilation of the waste-pipe will not prevent this; and the only remedy seems to be the adoption of an improved form of trap. Although attention has frequently been called to this imperfection in water-traps, I have yet to learn of any movement among architects or plumbers to secure any improvement. What is wanted is a trap through which air may be forced without driving out the water sufficiently to unseal it. Such a trap can be easily constructed. Are there any in the market?

Respectfully, Normand S. Patton.

NOTES AND CLIPPINGS.

Providence. — At the meeting of the City Council, April 19, the committee to whom was referred the proposed building-act made their report accompanied by a printed abstract of the proposed law. The law was then considered, section by section, and objections heard; and finally the city solicitor was instructed to apply to the Legislature at its next session (in May) for the passage of the act. It is but justice to the committee to say that their proceedings in the matter have been highly creditable to them, and gratifying to the friends of the law; after considering the subject fully themselves, they called a series of joint meetings of the committee of the R. I. Chapter, A.I.A., and a large number of the most experienced builders, at which every section was carefully considered, and suggestions received and heeded. The result is, that the law as now recommended, although somewhat reduced in bulk, contains nearly all the provisions originally reported by the Chapter, with many others of great value; and if it meets with the same kind reception from the Legislature, will be in many respects far the best yet enacted in this country.

The London Opera House. — It was recently asked in the House of Commons, what was to be done with the proposed new Opera House on the Victoria Embankment, work upon which had long since ceased because of want of funds. The chairman of the Metropolitan Board of Works answered that as the time fixed for roofing in the Opera House had expired, the Metropolitan Board of Works were considering what course they should adopt under the agreement.

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CINCINNATI MUSIC HALL. — An interesting question in connection with the foundations of this building will soon be decided, probably in the courts. The entire foundations (including the concrete) are to be torn down, having been condemned by the clerk of works, Mr. John Maccammon. The history of this work will not prove uninteresting, as the following facts will amply demonstrate. Within a month or so after the close of the Republican Convention that nominated President Hayes, the old Exposition Buildings were sold off at auction; and when bought in their new owners began to tear them down, and at the same time the architects, Messrs. Hannaford and Procter, commenced laying the foundation for the new building. The tearing down of the old buildings and the laying out of new work was all going on at the same time; and while stakes were being driven, lines stretched, carts driven over the lines and destroying them, the execution of the limestone foundations had to be looked after at the same time; and under such circumstances were the walls built. The work was stopped about the last of December, and allowed to stand during the winter. An examination of the walls when work was resumed this spring revealed the fact that the mortar had frozen, and was therefore little or no better than sand; that the bonding was bad, that the concrete was valueless; and after considerable delay the contractor was ordered to tear down and rebuild his work. This he refused to do: whereupon he was ordered to remove all his unused materials, which he did. The walls are now being torn down under the direction of Mr. Maccammon, as clerk of the works. The contractor of course received payments on account during the progress of the work, and he was notified several times that his work was not satisfactory; but he now claims that when any work was condemned he immediately removed the same, and did as he was told; he claims further, that Mr. Procter was always on the ground, and must have known what was going on. It now remains to be seen who will have to pay for the tearing down and rebuilding of the walls, which were about two-thirds done.

THE DORCHESTER MONUMENT. — The monument that was dedicated on the 19th inst., at South Boston, Mass., is six and a half feet high, two feet thick, and three and one-half feet broad. The shaft is of Concord granite, and the base of Quincy granite. On the sides of the shaft are two cannon in relief, imitating those at the top of Bunker Hill Monument which were used at the battle of Bunker Hill. The cannon, the faces of the shaft, and the moulded work of the base, are highly polished, and the monument is finished at the top by four cannon-balls. The inscription on the front of the monument is as follows: —

Location of the American Redoubts
on
Dorchester Heights
Which compelled the Evacuation of Boston
By the British Army,
March 17, 1776.

BRICKMAKERS' STRIKE. — The brickmakers of Trenton, N.J., struck on the 16th. They began work for the season on the previous Tuesday, and on Saturday night received only part pay, the employers saying the rate of wages for the season had not been decided upon. On Monday morning it was proposed to pay them at the rates of last fall, which were about twenty-five per cent less than last summer, and the men refused to work.

MAMMOTH BOILER. — A copper boiler is constructing for the Boston Navy Yard, to be used in impregnating timber for ship-building, docking, and piling, by the Thilmany process, which has been adopted by the General Government. It is to be eighty feet long, and six feet in diameter, with a spherical head, the material used to be pure copper five-eighths of an inch in thickness. The entire cost when completed will be about $30,000. The contract was awarded to the Globe Iron Works of Cleveland, O. The copper will be finished and shipped from Boston to Cleveland, and the entire work will probably be completed by the 1st of June. It will then require nine cars to transport it to the Navy Yard.

AMERICAN INVENTIVE PROGRESS. — Under the above heading the *Scientific American* of May 7 has a long and interesting article, from which we make the following extracts: —

To show with what rapidity inventors made improvements on inventions embodying original principles [says the writer], it may be noted that in the early days of the sewing-machine 116 patents were granted for improvements thereon in a single year; and out of the 2,910 patents issued in the year 1857, 152 were for improved cotton-gins and presses, 164 for improvements on the steam-engine, and 198 for novel devices relating to railroads and improvements in the rolling-stock. In the year 1848, three years after the publication of this paper was commenced, but 660 patents were granted; but under the stimulus of publishing those inventions as they were patented, ten years later, in 1858, the number had increased sixfold, reaching 3,710, while up to January 1, 1850, as already stated, the aggregate of patents issued amounted to 17,467; since that time and up to the present the total is 181,015. And curiosity here leads us [adds the editor] to review our own work, extending back, say, twenty years, or to 1857, a period during which 170,745 patents have been issued. We find, by actual count, that 62,062 applications have been made through the Scientific American Patent Agency for patents in the United States and abroad. This averages almost ten applications per day, Sundays excluded, over the entire period, and bears the relation of more than one quarter to the total number of patents issued in this country up to the time of writing.

TREE-PLANTING. — A notable act of the last Connecticut Legislature on the subject seems to have escaped attention. It provides that land planted to chestnut, hickory, ash, white oak, sugar-maple, European larch, white pine, or spruce, — a number not less than 1,200 to the acre, — shall be exempt from taxation for ten years.

A NEW ENGINEERING SCHEME. — One of the latest engineering projects is that of blocking up the Straits of Belle Isle, which separate the coast of Labrador from Newfoundland, in order to divert into the Atlantic the vast fields of ice which come down from Baffin's Bay and make the shores of the Gulf of St. Lawrence much colder than those of the ocean. It is thought that if the straits were shut up, the climate of Canada would be much tempered and navigation in the gulf could be kept up all the year round. The straits are eight miles and a half wide in their narrowest point, and very deep.

A PRUDENT STEP. — The Committee on Church Building reported at the New England Methodists' Conference lately that trustees of churches should hereafter be admonished by their mistakes against contracting debts for church building without scrupulous regard to expense, and the actual needs of church societies and their communities.

TENNESSEE MARBLE. — Large quantities of marble are being shipped from Knoxville, Tenn., to San Francisco, to build a Stock Exchange, which it is stated will be the finest structure of its kind in the United States.

THE INJURY DONE BY BAD COPIES. — An illustration of the influence of bad art in destroying the market value of high-class work has just occurred in London. Twenty years ago, much excitement prevailed there anent the Poniatowski gems, upon which an elegant book in a couple of quarto volumes, with 471 photographic illustrations, was published at the price of $105. The work was compiled and annotated by James Prendeville and the late Dr. Maginn, and edited by John Tyrrell; and for the purpose of taking the photographs Mr. Tyrrell took absolutely perfect casts of the entire collection of gems. The illustrations in their character as such were, of course, subject to copyright; but occasion was seized by nearly every Italian dealer in plaster casts to put into circulation series of imperfect reproductions, with which ultimately the market was so overstocked that the most nearly perfect of them all could not at last be sold for four cents apiece; and to sell them at all they had to be shipped to the United States, where the moulds eventually followed them. The Tyrrell collection, the only really perfect one, has changed hands, and the writer was asked to ascertain its value. But for the bad copies in existence, these examples of fine art would have brought a fair sum if put up at auction, but as matters stand they would not realize enough to make it worth while to dream of selling them: so, as it would be a farce to place perfect and imperfect work upon the same level, the present owner is advised to retain his property, which might else have borne a high value, if for no other purpose, at all events for that of using the subjects for illustrative vignettes, tail-pieces, and initial letters.

ROMAN POTTERY-KILNS. — Two good specimens of Roman pottery-kilns have been unearthed near Colchester Railway station, England. One is a rectangular furnace leading to an oven 5′ 3″ long, 4′ 1″ wide, and 4′ high, with three niches on each side. The other being circular is of a more unusual form and is 4′ 8″ in diameter.

MALMAISON. — The palace of Malmaison, which was to Napoleon the Great and Josephine what Versailles was to Napoleon III. or the Trianon to Louis XVI., is to be sold, and the land surrounding it cut up into building-lots.

OLD PARIS. — *La Bibliographie de la France* calls attention to the fact that in widening the Rue Saint-Jacques at Paris, many houses of historic interest are being swept away. "Au Soleil d'Or," in this street, is stated to have been the sign of the house where in 1473, three Germans, named Gering, Friburger, and Krantz, established the first Parisian printing-press; and from the Rue Saint-Jacques emanated many of the most ancient bibliographical treasures of the Sorbonne National Library.

THE TUILERIES. — The *Société Centrale des Architectes* of Paris has presented a petition praying for the restoration of the Tuileries.

GERMAN ARTISANS AND THE PARIS EXHIBITION. — The German workmen employed in various branches of industrial art have petitioned the Reichstag to reconsider its edict forbidding Germans to take part in the Exhibition of 1878.

DRAINING THE ZUYDER ZEE. — Preparations are now going on to drain the Zuyder Zee. A dam 40 kilomètres (24¾ miles) long, 50 mètres broad at its base, and 1½ mètres above the usual level of high water, is to be carried across the gulf. Upon this will be erected pumping-engines capable of discharging 1,716,000,000 gallons a day. Estimating the average depth of the gulf at about 4½ mètres, it will take steady pumping for 16 years to empty the enclosure. The cost of reclaiming the 500,000 acres now under water is estimated at about $67,000,000. It is confidently expected that about 430,000 acres will be suitable for agriculture, and can be sold at an average price of $800 per acre.

FIRE-PROOF CURTAIN. — Voss, Mitter, and Co., of Berlin, are fitting a new metallic fire-proof curtain to the theatre in Dresden, now rebuilding after destruction by fire. It is of corrugated iron. Exposed to heat, a brisk circulation of air is set up in the sections of tubes formed by the corrugations, the heated particles ascending, and colder particles flowing in to supply their place. The latter keep down the temperature so considerably that a sweating breaks out in the plate of which the curtain, or shutter as strictly speaking it is, is composed. The shutter made for the Dresden theatre is forty feet high and forty-six feet wide. The method of riveting the plates of which it is composed, and of raising and lowering it, are the subjects of patents.

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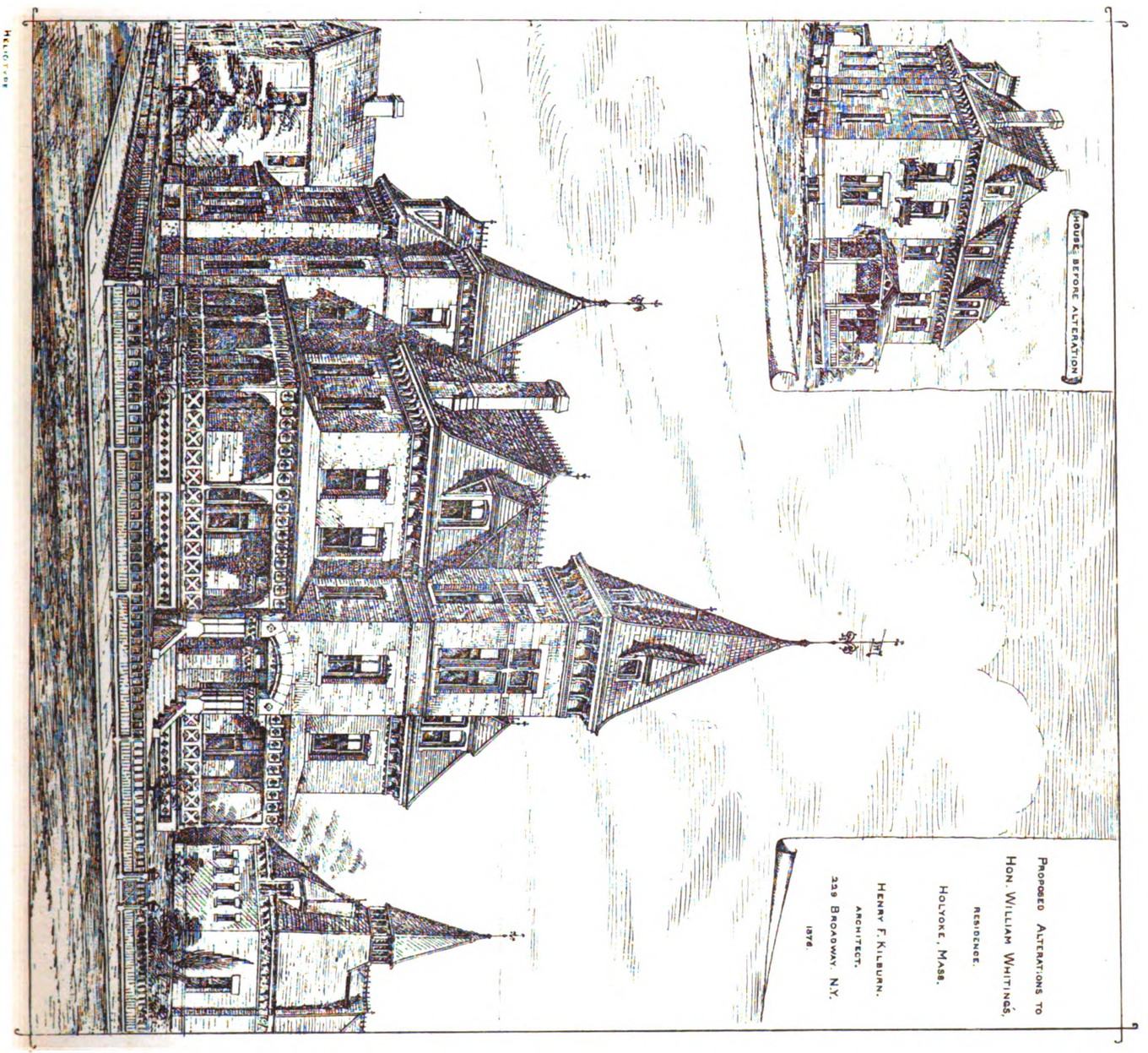

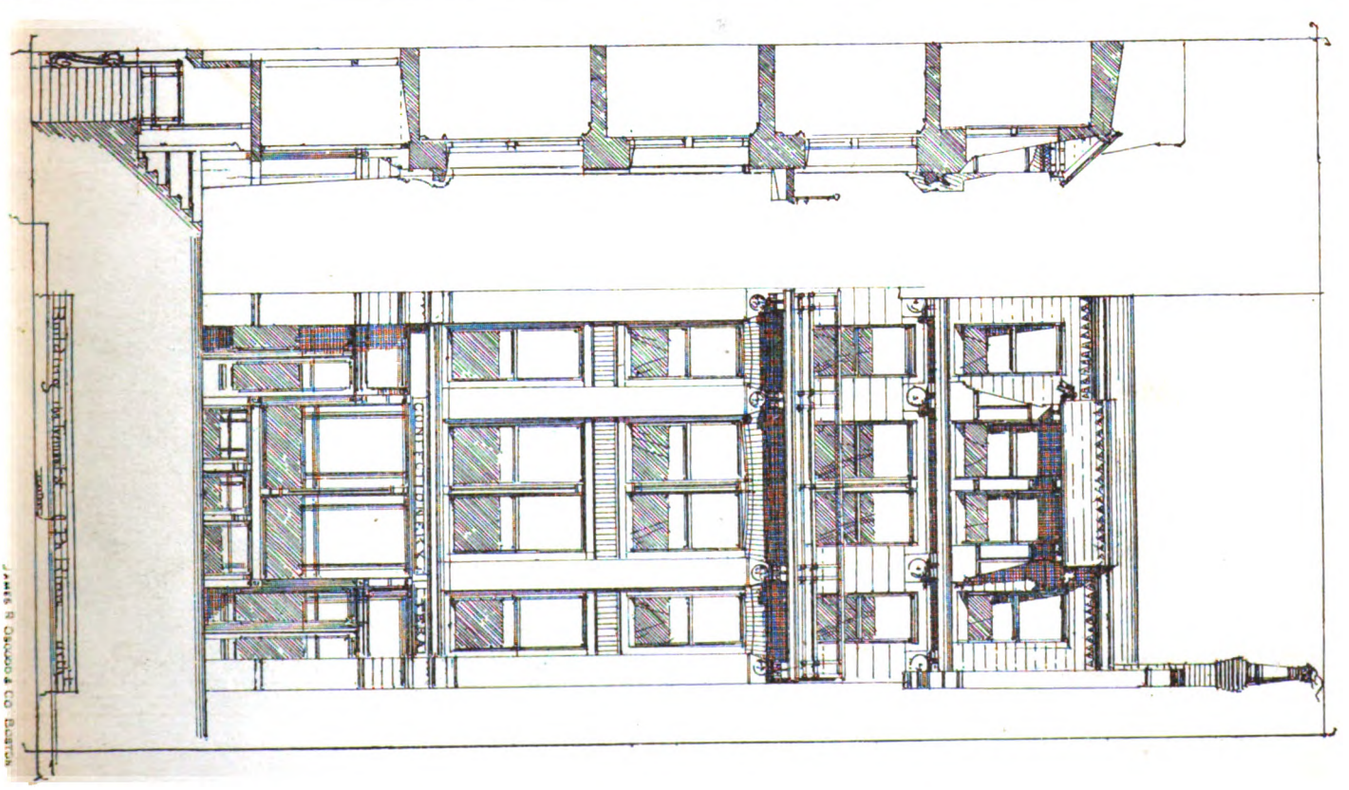

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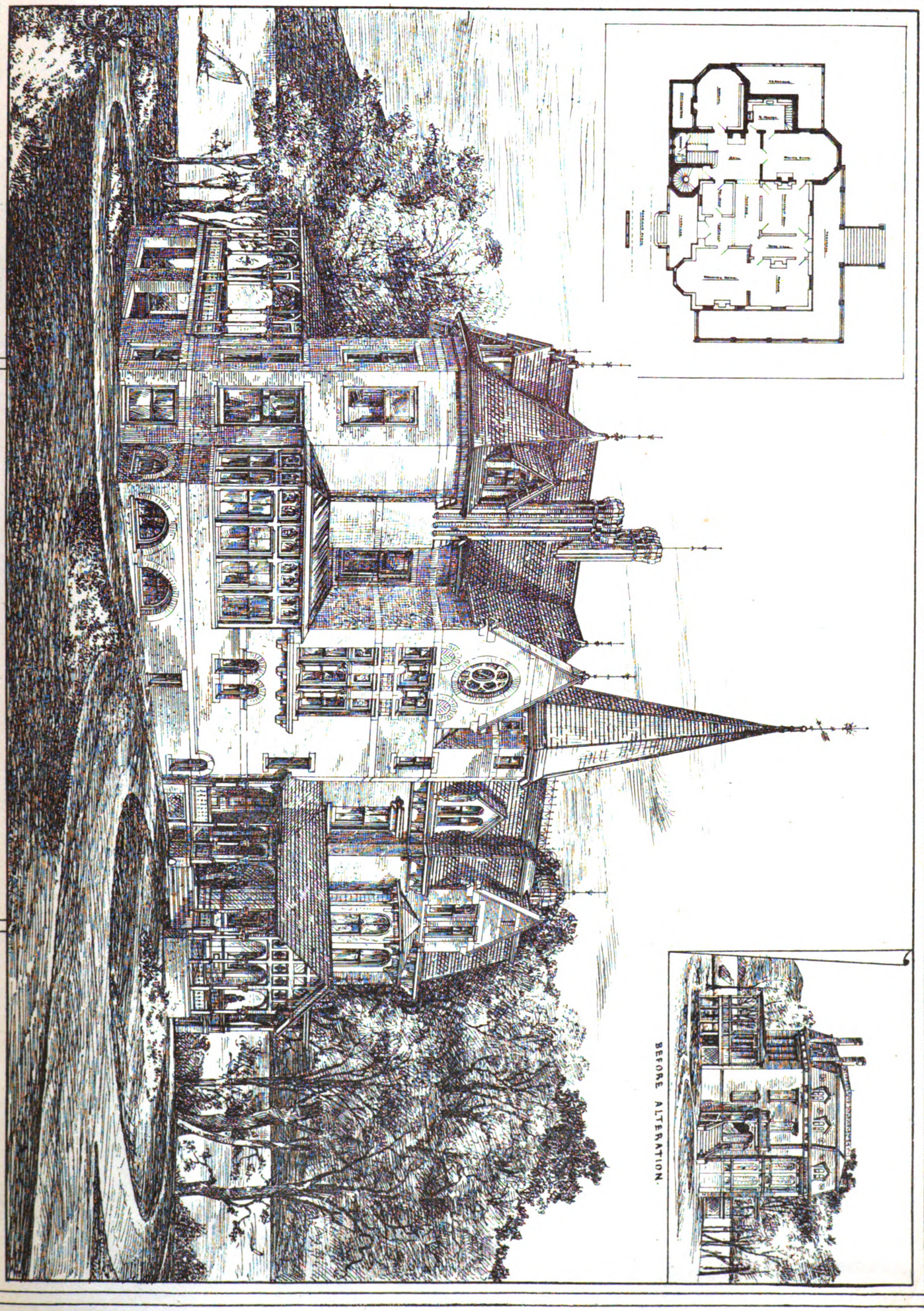

H. M. CONGDON, ARCH'T, NEW YORK.

ADDITION TO HOUT-AVERELL, COOPERSTOWN, N.Y.

RESIDENCE OF MRS. J. R. CARTER.

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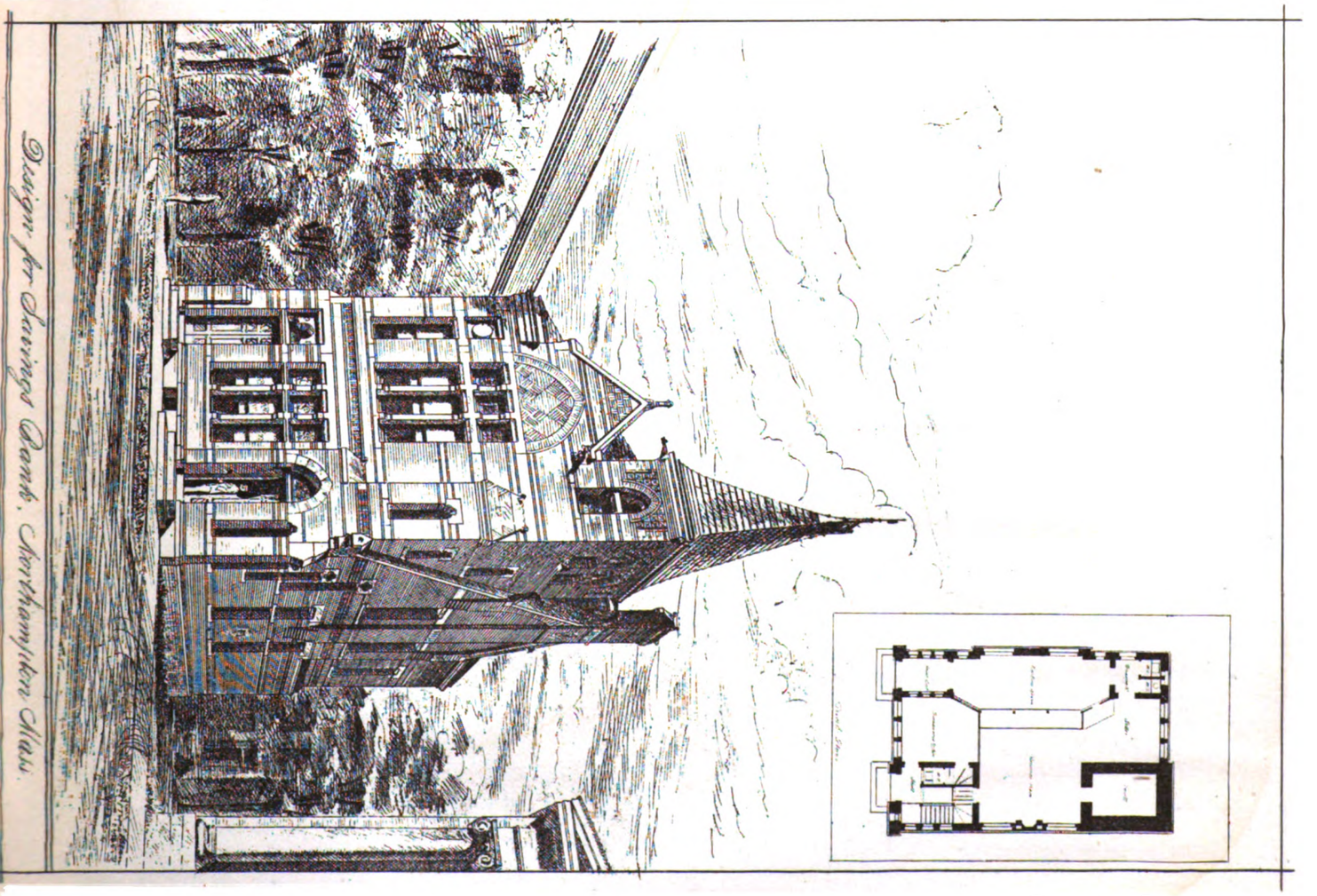
Competitive Designs for Northampton Savings Bank. Perry & Gardner, Archts. Springfield, Mass.



Design for Savings Bank, Northampton, Mass.

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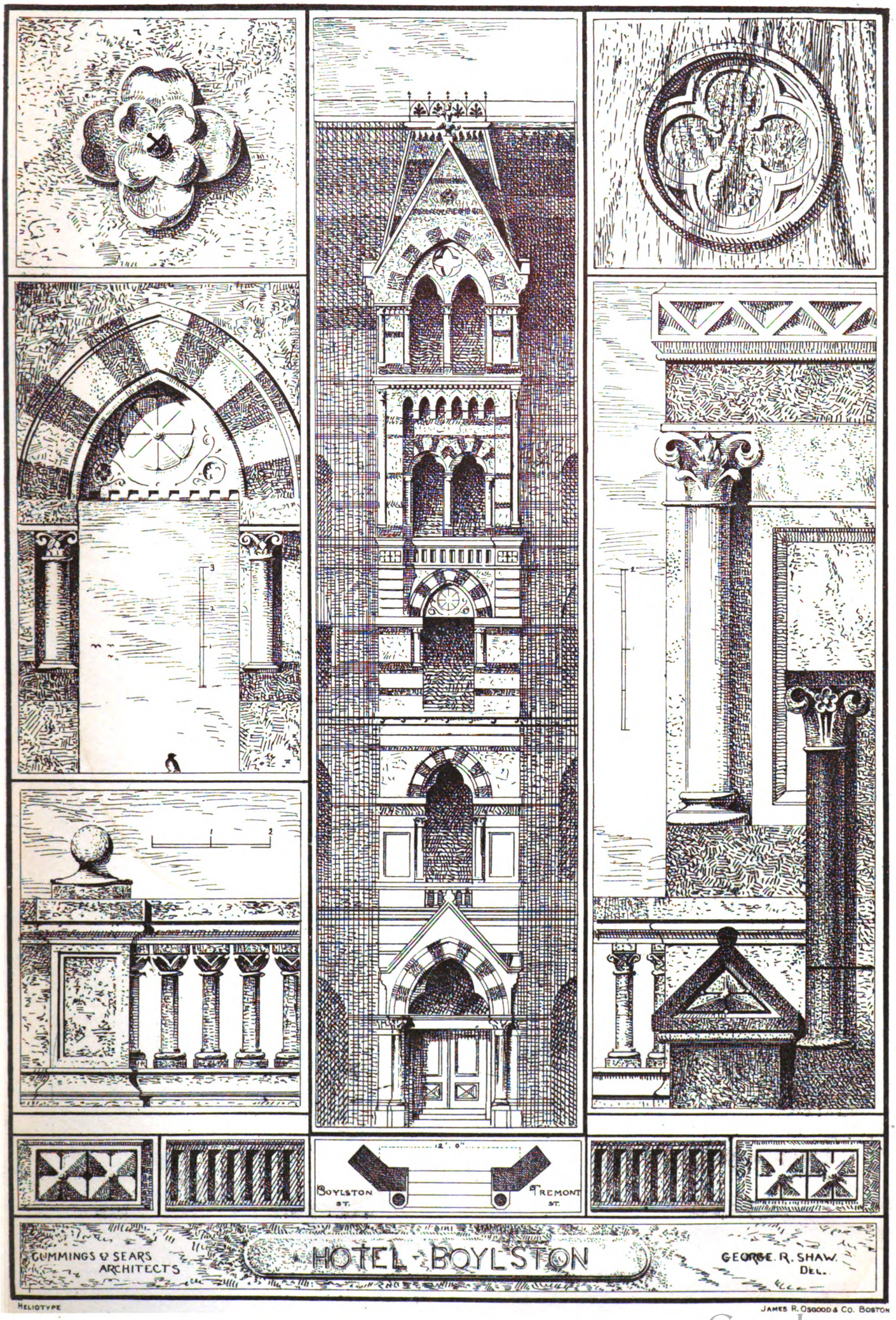

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BOSTON, MAY 5, 1877.

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IT is a pity that in this country the official investigation of such disasters as the burning of the Southern Hotel should be intrusted to bodies of so little weight as coroner's juries. The verdict which has been rendered in this case amounts to nothing more than an official statement of the popular opinion. It says that the fire originated in the basement storeroom or wine-cellar, and was communicated through the elevator. It censures the lessees for not providing and disciplining proper servants for the handling of their fire-apparatus, for keeping inflammable stores unguarded, and for not properly arranging for the awakening of their lodgers in case of fire. The suggestions of the jury strike us as remarkably feeble. They propose that all hotels shall be supplied with appliances for extinguishing fires, and gongs or bells for arousing guests, and with watchmen drilled in their use; and that building-inspectors shall look sharply after them in these respects. Their only suggestions of practical import are that storerooms, wine-cellars, and carpenter's-shops in hotels shall be made fire-proof, and that gas-meters shall not be allowed in them, which is well as far as it goes; that stairways and elevators should be as wide apart as possible; that elevators should close automatically in ascending or descending. All this scarcely touches the real necessities of the case. The provision of hose and fire-plugs is one which cannot be reasonably neglected, but can only be regarded as a forlorn hope. It cannot be hoped that in a hotel any service will be well performed which is not habitually rendered. To expect that their proprietors will maintain the abundant *personnel* and the discipline for emergencies that belong to a man-of-war is to expect what cannot be secured. If the safety of guests is the thing to be cared for, we can see no resource but in the improved character of hotel buildings. In behalf of this necessity we have scarcely heard a voice raised.

WE read of two associations of women for artistic ends which are taking form in New York and Cincinnati. That in New York is called a Society of Decorative Art, established with the twofold object of encouraging the production of such decorative work as women like to undertake, and of supplying women who need to work with an agreeable and remunerative way of doing it. We have not seen any account of the means by which this association proposes to accomplish its purposes, other than a general suggestion that it is by offering instruction for women who wish to learn to do decorative work, and by helping to find a market for the wares which they produce. There is so much interest in all sorts of decoration stirring among women, and so much demand for it in the community, and we may say, so much aptitude for it at work with very little intelligent direction, all over our busy country, that any movement which promises to turn these circumstances to a good account is to be heartily welcomed. The essential condition of its value however, is that it shall not be content to take things as they are, but shall lay its foundation in a sound and deliberate instruction of those whom it undertakes to befriend; and let it be understood once for all that it will not accept and assume to find a market for any but really good work. To increase the dissemination of the tidy but unskilful flower-paintings and poor pen-drawings that crowd our print-shops, or the uninteresting embroideries that our milliners sell, and which are tolerated only on account of the sex of those who manufacture them or the ignorance of those who buy them, is an undertaking not to be encouraged; it were better to form a society to confine them in the homes where they are produced and admired. There is ability enough and to spare for good decorative work, but it is not every woman that possesses it. That society will deserve well which shall devote itself to sifting the good from the bad, and enforcing the necessity of a really adequate training for the production of the good.

WHAT the really adequate training is, it is not so easy to say, and the means for it have yet to be provided, and in some degree to be devised. There is unquestionably much help in what the Cincinnati women propose to do with the assistance which they hope to evoke from the men. The title of their association is the Woman's Art Museum Association of Cincinnati; and their aim is the establishment of a museum on the South Kensington plan, for objects of industrial art of all kinds, and schools of training for draughtsmen and designers. We do not hear whether it is a part of their plan to limit the use of such a museum and school to women; but we should suppose not. The enterprise of the Cincinnati women in this undertaking is of a piece with the energy they have shown in the difficult art of wood-carving and in other decorative work, and such a museum as the South Kensington would look very much at home among them. It is questionable how far such means can carry art in advance of the taste of the surrounding people; but there is no better or more influential starting-point for the development of taste than among the women of a community.

THE *Chambre Syndicale des Menuisiers en Bâtiment* at Paris has offered through the Lord Mayor of London to present to St. Paul's Cathedral a sculptured pulpit, which shall cost from twelve to fourteen hundred pounds, in acknowledgment of the assistance given by English people to the French sufferers during the war of 1870. They propose to send a delegation to London to examine the place for which the pulpit should be designed, and to decide upon its form and character, in conference with the authorities there. The Lord Mayor, with suitable acknowledgments, referred the matter to the Dean and Chapter of the Cathedral, in whom the authority to accept the proposal rests. The courtesy is one for which the French themselves have perhaps set the only precedent, and which we should suppose the authorities of the Cathedral would be loth to reject. Yet, considering the many embarrassments that have beset all the projects for the decoration of St. Paul's, the difficulty and at the same time the importance of agreeing on a comprehensive scheme for it, and the wish, which it seems very necessary to resist, of all sorts of persons to try all sorts of experiments with it, it may be thought that there is danger in accepting an isolated piece of decoration. There is perhaps no important church in England in which a piece of French work would be so likely to appear satisfactory as in St. Paul's; but to accept a pulpit which should not, after all, prove to be at home in its surroundings would be awkward.

IT used to be a standing fling at the prosaic and non-appreciative Yankee, that he would, if he could, set Niagara Falls to turn a mill; but it is by a foreigner that the last and coldest-blooded suggestion of this kind is offered to us. It is probably pretty generally forgotten that the Niagara Falls Water-Power Company undertook twenty years ago to utilize a part of the power of Niagara, buying a site for a manufacturing village below the Falls, and digging a canal three-quarters of a mile round them to serve as a flume. The water-power thus secured has not been utilized, so far as we know; and at present the individual into whose

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hands it passed, Mr. Horace Day, finding himself in danger of losing his privilege by foreclosure of a mortgage, is said to be negotiating for the sale of it to a Canadian company. But lately, at a meeting of the Iron and Steel Institute of Great Britain, Dr. Siemens, the president, made an address which attracted considerable attention, in which he reverted to the immense power of Niagara Falls, which, insomuch as men have not yet converted it to mechanical uses, he conceives to be wasted. He computes the power of the Horse-shoe Fall at nearly seventeen million horse power; which is a pretty exact equivalent for what would be supplied by the present yield of all the coal-mines in the world. The immediate difficulty in utilizing the falls, besides the fact that they are not very kind to harness, is that the force is delivered at points where it is not convenient to use it, and the means of transferring it to points where it can be used to advantage are not yet at command. Dr. Siemens' suggestion is that dynamo-electrical machines. moved by the water, be used to generate currents of electricity which may be conducted to the necessary distances, and there made use of. He computes that a single three-inch rod of copper would convey a thousand horse power to a distance of thirty miles.

AT the risk of being set down as unbalanced sentimentalists, we must say that to us, as we fancy to most of the world, schemes of this kind are distasteful. It is not likely, to be sure, that in our day any serious attempt will be made to utilize the whole power of Niagara; and small supplies might doubtless be filched from it in such a way as not to injure its aspect. But studies of the capacity of its immense forces are empty pastimes if they are to lead to nothing more than the utilizing of such trifling fractions of its power as might be supplied by any of a thousand neglected water-courses throughout the country; while the mere ambition to bend a mighty work of nature to the service of man, for the sake of doing so, is a childish one. It is not conceivable that any considerable use could be made of the water-power of Niagara without injuring the magnificence of the fall and the beauty of its surroundings. The people of the whole country may be said to have a vested interest in it, which is too strong, and consolidated by too long usage, to be entirely subservient to the profits of riparian proprietors and speculators. It would be more reasonable that the General Government, which is honored for having set apart the Yellowstone Park region for an inviolable public ground, should extinguish by purchase the rights of those who own the shores of Niagara, than that it should allow it to be spoiled for the sake of speculative advantages. If it should happen by and by, that our sources of power were exhausted, the coal-fields given out and no substitute discovered for them, the lesser water-powers fully utilized, the winds and the solar heat found insufficient or unavailable, and the people in serious need of mechanical force, then the country might see the necessity of deliberately sacrificing to its daily wants the most splendid gift that nature has conferred upon it.

AT a meeting of a congress of learned societies at the Sorbonne in Paris last month, Mr. Waddington, Minister of Public Instruction, gave an account of a determination of the age of alluvial formations, by a French engineer, which promises to have important bearings upon historical and even geological chronology. The engineer, M. Kerviler, while making some excavations in the valley of the Loire, had discovered that the annual layers of alluvial deposit could, on careful examination, be counted like the annual rings in the trunk of a tree. The layers were from three to three and a half millimetres (say an eighth of an inch) in thickness, and each layer consisted of three thin strata, — one of vegetable detritus, one of clay, and one of sand; the vegetable matter being deposited in the autumn during the fall of the leaves, and the sand and clay during the summer and winter. The strata of sand which were distinctly to be seen gave the means of counting the layers, of which it was found that a hundred, representing the deposit of a century, occupied about thirty-five centimetres (13¾ inches). An opportune discovery gave an opportunity of putting the value of this way of estimating to a test. In excavating, M. Kerviler had discovered some coins of the Gallic emperor Tetricus, who was made emperor A.D. 267. A computation of the layers beneath which the coins were found gave the approximate estimate of A.D. 300. It is not to be assumed that such measures would determine historic dates with accuracy, but they would be of service in finding, with useful approximations, dates beyond the reach of history. Thus to certain bronze and stone implements which were found lower down, the date of 500 B.C. was assigned by computation of the deposit. Mr. Waddington proposes to give M. Kerviler the government assistance necessary to enable him to carry his researches through the thirty metres of alluvium which overlie the granite strata of the Loire valley.

BERLIN AND ITS BUILDINGS.[1]

BERLIN is as phenomenal a city as Chicago. It has not quite equalled the mushroom growth of Chicago; but its development is on the whole quite as astonishing, and is only paralleled in two or three of the most exceptionally favored American towns. For instance, at the end of the seventeenth century, Berlin, New York, and Philadelphia were small towns of about the same size, containing each five or six thousand inhabitants; at the end of the eighteenth the population of Berlin was in round numbers 180,000, that of New York 60,000, of Philadelphia 70,000; in 1871 Berlin had 828,000 inhabitants, while Philadelphia in 1870 had near 700,000, and the city proper of New York about 900,000. But it is the distinction of Berlin that while the other great cities of the world have owed their pre-eminence mainly to exceptional advantages of situation, Berlin has grown great in spite of what is apparently a most adverse site. In the midst of the alluvial plain of Northern Germany, on an insignificant, sluggish, and barely navigable tributary stream, in a rather sterile region of sand and marl, and not many feet above the level of the remote sea; with a forbidding northern climate; not immediately connected with any region of great natural productiveness, nor in any natural highway of communication, — Berlin is, one would say, signally destitute of natural advantages. It has apparently risen to its present condition by the sheer force of will of its rulers and people, and is a monument of the same steady firmness of purpose which has in two centuries raised the state whose capital it is, from an inconspicuous electorate to a kingdom of the first importance, and its sovereign to the most powerful emperor of our day. It is in truth a city as much made to order as were Alexandria and Constantinople, and unsustained by any such commanding merits of situation as they had. The city is not a very old one, its records running back to the beginning of the thirteenth century when two insignificant contiguous villages, Cöln and Berlin on the banks of the Spree, the nucleus of the present town, had probably but three or four thousand inhabitants between them. The former of these, on a little island enclosed by the river, was naturally from its more secure position the more important town during the stormy epoch of the Margraves of Brandenburg; and here in the middle of the fifteenth century, when the newly made Electors transferred their residence to the present capital, the second of them built the castle which, enlarged and rebuilt from generation to generation, remains the "*Schloss*" or sovereign's residence to this day.

The real prosperity of Berlin dates from the time of the "Great Elector" William Frederic, who in the latter half of the seventeenth century laid the foundation of the Prussian kingdom, fortified and improved the town, and established what became the Royal Library in it. His son, the first king, with less political ability than his father, devoted himself more to the embellishment of his capital. He admired, and during his rule as elector imitated as well as his slenderer means would allow, the lavish ways of his contemporary, Louis XIV. of France; though before the end of his reign, he reached the end of his purse. Under these two sovereigns the city increased enormously. Their policy encouraged an influx of foreigners, chiefly Protestants, from all sides; so that Berlin became known as a city of refuge, and between the accession of the father in 1640 and the death of the son in 1713, the population rose from 6,500 to 61,000. It is recorded that at this last date the number of houses in the town was 1,553, which gives a curious idea

[1] Berlin und seine Bauten. Herausgegeben vom Architekten-Verein zu Berlin. Mit 600 Holzschnitten nebst 8 Kupfer- und Karten-Beilagen. Zwei Theile. Berlin, 1877. Eigenthum des Vereins. Für den Buchhandel, Ernst und Korn. *B. Westermann & Co., agents for the United States.*

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of the compactness of the population, showing an average of forty dwellers in each house. The crowding seems to have rapidly relieved itself however, for in another twenty years, when the inhabitants numbered 90,000, the number of houses had grown to 5,796. A view of the city in 1688, copied in the work before us from a print of that time, shows the principal thoroughfares of the centre of the modern city already closely built upon, and several of the oldest buildings now left are recognizable in it. The next king, the choleric father of Frederic the Great, maintained the family interest in his capital, dividing the little money he was willing to spend between his famous tall grenadiers and the streets of the city. He compelled the inhabitants to build according to his royal will: he laid out new suburbs, and expended upon his streets 250,000 marks and ninety thousand cubic yards of paving-stones. Frederic the Great found time amid his political and military cares to consider the extension and improvement of the capital which he neglected as a residence. Under him the present *Domkirche* was built, as also the original opera-house, and in the latter half of his reign, many buildings for military and civic uses. The population, which was checked in its growth and even diminished during his period of incessant warfare, recovered itself, and before his death in 1786 had reached 145,000.

The impulse and direction given to the city by the vigorous nursing of these successive sovereigns survived them; and the city seems to have continued to grow as if by its own momentum in spite of the check it received during the Napoleonic wars, and its occupation by the French. Its population, 180,000 in 1804, fell in the next six years to about 150,000, but in 1820 had risen to 200,000. In twenty years more it was as we have said 328,000, and its progress since has been almost unparalleled. Thus Berlin in spite of every apparent natural disadvantage, and the ravages of continual and often exhausting wars, was developed by the steady care of the Prussian kings, until it attracted by its predominance as the chief North German city, the accretions which its position would never have drawn to it, and grew by virtue of its own magnitude. It is a notable instance of the power over untoward circumstances — such circumstances as it is commonly thought impossible to control — of a firmly maintained purpose backed by the authority of a line of vigorous monarchs.

Firmness of purpose can make a city grand and imposing, but it cannot make it beautiful; and Berlin is not beautiful. There is a certain stateliness in the aspect of the more important streets; the general impression is one of coldness and formality. We speak the impression, be it said, of a traveller of half a dozen years ago, and Berlin may have changed somewhat in half a dozen years. It needs such a work as this which we have before us to remind one how much fine work there is among the immense number of its buildings, swallowed up, or overpowered in the general effect, by the mass of rather gloomy commonplace that predominates in its streets, as in truth commonplace of one kind or another predominates in the streets of every modern city. The architecture is more marked by formal dignity and balanced symmetry than by grace or elegance; and seems in some sort to reflect the reserved, unpliant, and rather cold character that we are accustomed to ascribe to the nation which produced it, with something of the disciplinary rigor of its sovereigns. Its characteristics are set forth with judgment in this sentence which we translate from the interesting introductory chapter that Herr Fritsch furnishes to the descriptive part of the book: "A clear well-considered distribution, a serious effort for organic connection of parts, a conscious moderation in detail, — these are the peculiarities which set the mark of kindred upon the artistically conspicuous buildings of Berlin, and at the same time constitute the superiority of its school of architecture. In truth, this thoughtful moderation, which not infrequently works meagrely and coldly, has assigned to the architectural creations of Berlin a certain limit in what may be accomplished, which is broken through only by the few pre-eminent artists in whom fancy and active reasoning powers are happily balanced." The formal traditions of the Renaissance have retained their influence in Berlin more than in almost any other city; the modern interest in mediævalism has not made any mark there. What slight attempts at mediæval style have been made have had an ill success which seems to show that they went against the grain. The freedom or license of eclectic fancy which has invaded the other transalpine cities of Europe has left but little trace in Berlin. The only influence which seems to have seriously modified the tendency to Renaissance design has been the Greek revival of the first quarter of this century, which, introduced with greater freedom and invention than belonged to the Berlinese treatment of the preceding Italian style, has since the time of Schinkel gradually leavened that with a spirit of greater elegance, and has produced in the hands of Stüler, Strack, Hitzig, Gropius, and other able men, some of the best work of our day.

Berlin und seine Bauten is a sumptuous octavo volume of nearly eight hundred pages, prepared under the direction of the Architectural Association of Berlin, and published by it, but bearing the well-known imprint of Ernst and Korn. It is handsomely printed, and illustrated with more than six hundred exceedingly well executed new cuts. It contains an historical sketch of the growth of the city; an introductory essay on its architects and architecture, from which we have already quoted; a classified account of its buildings of various kinds, old and new, as well as its engineering structures, liberally illustrated; and an essay on its building-materials and methods of construction. The preparation of the different divisions of the book has been assigned to different architects, and their work seems to have been done with judgment and thoroughness. The illustrations are well chosen and of admirable clearness. The woodcuts allow a profusion of illustration which would be impracticable with elaborate plates. They are as useful for suggestion as more pretentious engravings by which nothing of importance could be added unless details were shown; and this in a work of such scope is obviously out of the question. We commend to the notice of our readers this interesting book, of which we may find an opportunity to speak more in detail in a second notice.

STUDIES OF INTERIOR DECORATION.

VIII.

WE have developed, out of the essential conditions of the subject, an outline or theory for the completion of the dining-room shown on the plan in Plate IV. This theory embraces the following requirements: first, to have on the two long sides a symmetrical arrangement of opposite features; second, to connect these together by cross-beams resting upon dividing pilasters; third, to continue around the room the lines of the glass frieze in the partition which separates the dining-room from the drawing-room, as exhibited on Plate V.; fourth, to make this frieze dark in tone; fifth, to establish a dado and screen on the walls in contrasting proportions; and, sixth, to treat the room with rich low tones.

These requirements embrace all the essential conditions of decoration to be observed in this room. It seems to us that none of them have been forced into service for the sake of introducing a favorite *motif* — a temptation to which the artist is constantly subjected. His position in this respect is analogous to that of the poet, who, desiring to make the most effective and beautiful presentation of his subject, is embarrassed by the activity of his imagination, which tempts him to overlay his theme and smother it, as it were, under a profusion of figures and metaphors, until the unity of it is lost sight of, and he finds himself compelled to review his work in a spirit of painful self-denial. In like manner the mind of the architect is so compact of innumerable favorite details and *motifs*, that it is not easy to prevent these from becoming his master. No artistic result is possible under such subjection. Self-restraint, in fact, is necessary to all good design, especially while we are engaged in considering the outlines or general treatment of the subject. This, as we have seen, even in mere works of decoration, is a matter of serious consideration and analysis. Caprice, the play of fancy, may have its proper place in the filling in of these outlines at a later stage; but the outlines themselves in every case, whether on the outside or the inside of a building, are by no means to be lightly decided. In the case of this dining-room, we might have begun the work of decorating it by assuming that we would have a red or blue room, or we might have hit upon a certain style that we fancied; without stopping to consider what is really best to be done under the circumstances, we might have jumped at the conclusion that it would be a fine thing to make of this an Elizabethan room, cut up its ceiling with an arabesque of stucco, cover the walls with a panelled wainscot, and treat the chimney-piece monumentally with carved pilasters and a broken entablature; or we might have adopted the French Renaissance, and tried to recall an effect in some fine old château or hotel, that we have set down in our note-books as worthy of use when occasion offered; or, seduced by a brilliant interior of Talbert, by a study of Dresser, by a clever detail of Morris, by a Moresque fancy of Owen Jones, or by a painted wall-screen from

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Japan, we might have strained a point to reproduce features which, however interesting in themselves, were invented to suit other conditions and surroundings. This, we believe, is the usual method of interior decoration; and to this inartistic method we may attribute the great misuse of opportunities, and the frequent unsatisfactory, commonplace, and incongruous effects which result from it.

In the first place then, our scheme involves, for reasons set forth in our last paper, a symmetrical arrangement of opposite features on the two long sides: to give full effect to this correspondence of parts, we divide these features into distinct unequal bays by pilasters bearing cross-beams which have a similar relation to both sides of the room. In order that the eye may more readily mark the relation between the beams and the pilasters, we connect them by curved and moulded braces. These constitute a salient feature, and there cannot be a moment's misapprehension of the object of them. It is true that they have no practical function of support, but they are an admissible feature of decoration, as they serve to emphasize and define the bays and to create an effect of unity. The central and most important bay has on one side the chimney-breast, on the other the sideboard; the adjoining narrow bays on each side of the central bay are occupied on the left with buffets, and on the right with the wings of the chimney-piece. The buffets are glazed and arranged for the accommodation of such fine china, glass, plate, and other enrichments of the table service, as without such accommodation would be lost on the higher shelves in the neighboring pantry; the portion of the chimney-piece which occupies the front of the chimney-breast is kept flat in order to avoid narrowing by a mantel-shelf that portion of the room which most requires available space, and the accommodation of the mantel-shelf is afforded in the narrow bays or wings on either side.

Our conditions require a dark frieze with vigorous lines of decoration. The treatment of this frieze must be influenced also by the fact that the room has an abundance of southern light, and masses of black walnut in the dado, furniture, beams, pilasters, and doors. The former consideration calls for a prevalence of cool colors; the latter affords an additional reason for dark ones to enhance the yellowness of the wood. These conditions would be more completely met by old tapestry equally woven with leather-colored and light-brown figures upon a *dark-green* background having almost the value of black. In the absence of tapestry we would, if possible, select a paper with a suggestion of texture, covered with fruitage and leaves, their natural growth stiffened so that the main movements of the stems shall be vertical, with horizontal branches, thus recalling the rectilinear outlines of each section of frieze. This dark rich mass is balanced by a panelled dado, distinctly wider than the frieze, having a carved belt against a black background, on a level with the eyes of one seated.

The drapery is of dead neutral or sage-green with a dark red or maroon band at the top, and a similar broad band at bottom, nearly coincident with the dado. These maroon bands are crossed with black or dark-green velvet, so as to break up the masses into irregular widths. The maroon is separated from the main green fabric of the curtains by black or gold-colored cords, — the former if the fabric is broken with damask figures, the latter if it is plain or merely ribbed. The valance is of the same material decorated with a heavy knotted fringe of darker green. The effect aimed at is an enriched coolness and soberness of tint; and the material should be something that will fall in soft folds, and rich enough, when drawn across the opening of the bay, to make an interesting background.

Further to enhance the yellowness of the wood we would treat the panels in the sideboard with flowers or figures in natural colors, upon a dead black background. The recess in which the sideboard and buffets sit should receive a maroon tone in the parts shown over their tops, and the glass buffets should be lined with red velvet to offset their display of household wealth.

As for the screen which occupies the greater part of the wall-spaces between frieze and dado, its function is to redeem this background which we are establishing from an absolutely absorbent heaviness. This result we would obtain by occupying it with buff leather tones broken up with such a diaper as will enrich the surface without making it gay. Against this let us suspend our choicest faience and maiolica.

In the whole treatment of the vertical surfaces we are governed by the fundamental condition that they are to form a background for the table when set in full array, and for such wealth of pottery as we may have at command. In the ceiling between the beams we would repeat the neutral yellow of the screen surface, but in clearer or cleaner tones with border-lines of red and dark green, the former predominating.

This description may serve to give to the sixth plate of our series the life and significance of color without which the forms are dead. To this symphony, there is essential the weight of an Oriental carpet with a firmly marked border and a central mass broken up into figures which no one can look upon and remember, — the work of looms which seem to express in color and form undecipherable mysteries, traditions of ancient harmonies. In the fabrics of Western nations, form always competes with color in interest; form is a conscious element in the work. But in the best Eastern carpets and rugs form and color are so combined that one is essential to the other; they cannot be separated without becoming incoherent. This is the secret of their beauty and usefulness as decorative agents. It would be desirable in such a room as we are imagining, to select a carpet in which no color shall *predominate* which does not appear upon the walls. This eschews blues and reds in quantity but admits them in subordinate capacities. If we use a Western carpet its field should be made up mainly of olive or brown figures upon a sage-green ground, with a distinctly defined border having a predominance of black. We consider it a common error to have the same colors prevailing in border and field; the former, to have its proper value as a boundary, should evidently be in contrast with the latter, and the decorations of the field, as we have heretofore insisted, should be such as to be read equally well from any point of view and to lose none of their value where accidentally covered by furniture. Perhaps if the Japanese device of disposing figures unsymmetrically and apparently accidentally upon the field could be transferred to carpets, they would gain a quality of decorative usefulness which must be wanting where the figures are equally and symmetrically distributed on a geometrical basis. Indeed, it would seem to be a proposition worthy of consideration, that in surface treatment wherein the forms have at least an equal value with the colors, a field occupied with symmetrical decoration, that is, with forms having a geometrical relation, should not be used, either on wall or floor, in positions where any portion of it is likely to be covered; for the peculiar value of such a decoration consists in the fact that the regular and orderly relation of the parts to the whole, of the centre to the border perhaps, or of the details to certain regularly recurring mathematical lines or points, whether expressed or implied, is understood at a glance. This can hardly be the case if a picture in the one case or a piece of furniture in the other so conceals the field that these relations cannot be felt or understood. An unsymmetrical decoration on the other hand, such as is common on a Japanese panel, plate, or screen, seems devised to meet this condition of use without loss of any essential decorative value. This is instanced especially in the background of Japanese pictures. Where, however, the forms in surface treatment have a less value than the colors, as in diapers and damask designs, or where the figure is very small, it is evident that the condition of symmetry is too unimportant to be affected by this proposition. H. V. B.

THE ILLUSTRATIONS.

COTTAGE AT NEW BRIGHTON, STATEN ISLAND, FOR ALEXANDER J. HAMILTON, ESQ. MR. BASSETT JONES, ARCHITECT.

(41 West Seventeenth Street, New York, N.Y.)

THIS cottage, now nearly completed, is situated half-way between New Brighton and the Quarantine, on the Shore Road, and stands on the slope of the hill, about fifty feet above the level of the water. The frame of the house is supported on solid stone foundations, with a large cellar under the central portion. The first floor is laid double with felting between. The first story is divided into a parlor, dining-room, serving-room and china-closet, kitchen, store-closet, water-closet, and hall. The second story contains four bedrooms (the principal one extending out over the veranda), bath-room and water-closet, and six capacious closets, fitted up with shelving, etc. The servants sleep in the attic. The frame is covered with diagonal boarding, felting, and novelty siding, and the roof with shingles. There is a ten-thousand-gallon cistern outside, with a filter. The water is forced up to the tank through the pump in kitchen, to supply the water-works. The building, when completed, will cost $4,800. The work was done by Messrs. Thompson and Fetherstone, of New Brighton and Stapleton.

GARDENER'S COTTAGE AND STABLE, FOR WILLIAM KREBS, ESQ., STATEN ISLAND. MR. BASSETT JONES, ARCHITECT.

(44 West Seventeenth Street, New York, N.Y.)

This building stands almost on the edge of the bay, and faces the cricket-field, from which point the view is taken. There are several features yet to be added before the building is finished. The style both of the cottage and stable is a somewhat free adaptation of Queen Anne forms. Messrs. Thompson and Fetherstone were the contractors.

DESIGN FOR A REFORMED CHURCH, JERSEY CITY HEIGHTS, N.J. MESSRS. ROBERTS AND TAYLOR, ARCHITECTS.

(Newark, N.J.)

It is intended to build this church of brick, with open-timbered roof, covered with slate. The walls are to be faced outside with pressed brick, with white bricks laid in diaper patterns and ornamental bands. The estimated cost is $10,000.

HOUSE FOR PROF. J. D. RUNKLE, BROOKLINE, MASS. MR. G. D. RAND, ARCHITECT.

(15 Pemberton Square, Boston, Mass.)

STUDY OF INTERIOR DECORATION. — VI.

See the article above on this subject.

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THE SANITARY CONDITION OF CITY HOUSES.[1] — II.

HUMAN ingenuity has been able as yet to devise no system for the disposal of all manner of liquid waste which is at once so inoffensive, so invisible, and so healthful as a well-arranged system of water-carriage removal. The unfortunate thing about it all is that it is easy to meet the requirements of the fastidious by such a development of the system as is from a sanitary point of view the worst possible. Marble-top wash-stands with silver-plated fittings, decorated china closet-bowls, planished copper baths set in cabinet work of hard wood, stationary trays in the laundry, and the brightest and handsomest workmanship wherever the plumbing is visible throughout the house, are too often, indeed it is hardly extravagant to say almost universally, the outward manifestation of the most pestilential hidden dangers. Art can hardly achieve more in the the way of luxurious appointments than is compassed by all of these details in a modern house of the best sort. The character of their finish has much to do with the estimate that the intending purchaser or tenant puts upon the house he examines, and they are the subject of some of the most minute of the architect's specifications. When we consider the interior construction and arrangement of the hidden system to which they belong, we approach a part of the subject concerning which the purchaser, the architect, and the tenant are too often ignorant and indifferent. Nor do the dangers which belong to the modern house drainage system cease when we pass the limit of private work, and come to the public sewer to and from which the house drains lead.

The sewer and the drain meet one imperative requirement of the community. They are hidden from sight, and their processes are not offensively manifest, as are those of the slush-bearing surface gutter.

It is often assumed, perhaps because of the name given to the air of which we hear so much and which is so widely destructive, "sewer-gas," that the difficulty lies entirely or chiefly in the public sewer, and that we have only to improve the character of this or so detach our private system of drainage from it as to prevent the transmission of its air.

It is probably true that no city of its age can rival New York in the defective condition of its brick sewers. They are too often badly planned, badly built, and badly kept, and they do unquestionably produce a vast amount of disease and death. We can by no means, however, charge them alone with all or nearly all of the harm that is done; for so far as the production of dangerous gas is concerned, the waste-pipe of the house itself, smeared from top to bottom with the foulest organic matter putrefying under the worst conditions, and with frequent variations of temperature caused by the entrance of hot and cold water, is at least a brave rival of the worst street sewer.

The lack of ventilation of even the best sewers of New York and of American cities generally makes it important that we shut off as completely as possible the communications between the air that they contain and the air of our soil-pipes. Were these sewers well made and properly ventilated, the suggestions about to be offered concerning the soil-pipe might be materially modified; but circumstanced as we are with reference to public sewer, we must arrange to use it only as a means for getting rid of our liquid outflow, and must provide for our security against injury from its poisonous gases by a proper construction of our own *cloaca minima;* that is to say, we must have no more to do with the public sewer than is absolutely necessary, treat it as a deleterious outside influence against which we must adopt safeguards.

There are still very many houses in all our cities in which lead soil-pipes are used. The experiments of Dr. Fergus of Glasgow have demonstrated in the clearest way the great susceptibility of lead to the corroding influences of the foul gases arising from organic decomposition. He cites a great number of instances in which even after a few months' use the action of these gases upon the material of the soil-pipe has perforated it through and through, and in some cases completely honeycombed a considerable area of its wall. This effect is produced by gases and not by the foul water, as is proven by the fact that the perforations are always at the upper side of the pipe, and never on its lower side where the water flows. It occurs along the upper side of horizontal and oblique pipes, and especially at the upper side of a bend as in front of a trap, for the reason that the lightness of the gas causes it to lie chiefly against these parts of the pipe. The perforations being at the upper side of the pipe, they are not manifest by the leaking out of water, as the conduit is rarely filled. Often where it is horizontal or oblique it serves only as a gutter, its upper side being largely eaten away.

Even the smallest perforation may become a source of the most serious danger; a mere pin-hole may permit the escape of such an amount of air from the pipe as to poison the atmosphere of a large room. The apertures formed by corrosion, however, are rarely so small as pin-holes, and they are not infrequently large enough to admit the finger.

In modern practice it is almost universal to use for the soil-pipe and the larger branch-wastes, cast iron in the place of lead. This material is not susceptible of perforation from the action of its contained gases; but as drainage works are constructed, it is often fed by numerous waste-pipes made of lead, which come to it from bath-tubs, wash-basins, butler's sinks, laundry trays, and urinals, and even the water-closet usually has a trap or a connection pipe of lead. All of these leaden connections are subject to the same liability to corrosion as is the lead soil-pipe itself; and in one sense they aggravate the danger, from the fact that perforations occurring in them are more likely to discharge gas into sleeping-rooms or into the more frequented parts of the house.

The especial adaptation of lead to the construction of these minor waste-water channels because of its flexibility, and the ease with which it is jointed, make it almost necessary that it should be used; but, as plumbing-work is generally constructed, it is used with more or less risk of danger.

The old soil-pipe was invariably a tight one, and was generally separated from the connection with the sewer by a trap. The air it contained was not only extremely foul, but it was subject to expansion on the admission of warm water and from the production within it of the gases of decomposition. This expansion *must* be relieved; and it invariably is relieved under such circumstances, by the forcing of that one of its traps which has the least head of water to be overcome. The air in a street sewer is generally subject to more or less expansion from the same source, and to compression by the entrance of large volumes of storm-water, and by the blowing of strong winds against its outlet. The pressure in this case finds its relief by forcing the weakest house-drain trap, and the weakest trap between that house-drain and the interior of the house.

It has for some time been usual in all complete plumbing-work to relieve the soil-pipe by carrying a small "stench-pipe" from its upper part, out through the roof of the house. This is generally a pipe of not more than 1½ or 2 inches in diameter; and in order to protect it against the admission of rubbish from above, it is either domed over, and perforated with a number of small holes, or its upper end is bent so that its outlet shall be turned downward. Where this pipe is not so long and crooked as to offer considerable resistance by friction, and where the perforations at the top are sufficiently large and numerous, it serves a good purpose in relieving the pressure of expansion. Under quite unfavorable circumstances it will still, probably, be easier for the pressure to relieve itself through this stench-pipe, than through any water-trap; and in so far as the danger comes from this cause, it is an effective device.

The more recent investigations into the nature of sewer-gas have demonstrated that in its poisonous condition it is the product of an obstructed decomposition; of fermentation, which Pasteur aptly calls "life without air." The atmosphere within the soil-pipe does not contain sufficient oxygen to supply the continuous decomposition, which is thus checked until the oxygen which it requires is supplied by constituents of the organic matters themselves, — a process which leads to a radical difference in the resultant gases. Instead of being a thorough destructive oxidation of the material, it becomes a putrefying decomposition, producing foul smelling and dangerous results.

That part of the soil-pipe which carries the waste of the butler's pantry and the kitchen sink is more or less charged with melted grease, which coats particles of food and of filth, and so shelters them from the action of the air, giving the same pernicious character to their decomposition.

[1] A paper read before the Public Health Association of New York, by George E. Waring, jun.

TOWN ARCHITECTURE AND MODERN PROBLEMS.

[A portion of Prof. Barry's Sixth Lecture on Architecture delivered at the Royal Academy.]

WE often hear laments on the extinction of good taste. All, we are told, is common and vulgar, and we are daily plunging into lower depths of artistic bathos. Railways and kindred inventions, which have done so much to increase the power of man over matter, are complained of as the executioners of art; and in the opinion of some, all that we have to do is to seclude ourselves from such base associations, and draw gracefully around us the garment of refined exclusiveness, before we bid a final farewell to a vulgar and pushing world.

This spirit is not uncommon; it finds vent sometimes in laments over all that has made our country great among the nations of the world, sometimes in pensive regrets over the color of a fabric or the pattern of a coal-scuttle. It may, however, be doubted how far such despondency is to be justified by facts; and, still more, how far it is likely to be profitable for improvement in art. We may start by agreeing that ugliness is common enough, without conceding that it must so increase as ultimately to overwhelm us.

Good taste, if not common among ourselves, has ever been the heritage of the few. Is there less of it at the present time? or is it the fact that the many have come more to the front, and that their requirements have thus acquired a special prominence? We are not able to assume that, even among the Greeks, good taste was common. The buildings which are left to us are precisely those on which we should expect to find that every resource of art had been lavished. Of daily life in ancient Greece we know little, and we cannot assume that it differed greatly from what our own would be under similar circumstances. Different times and circumstances lead to different manners; and the problems we have to

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solve in this anxious and brain-busy nineteenth century differ as greatly from those which presented themselves in the morning of the world's history, as do the grave pursuits of a modern philosopher from the happy and graceful gambols of a child amongst her flowers.

Modern civilization may sometimes seem to repress individuality, and its progress to resemble the march of an army, treading steadily with a common step. But this is not the whole truth. If it be true that it is rarely given to one mind to strike out novelty of a startling nature, and conquer by the flash of genius, it may be remembered that our army of progress resembles a column which never retreats, and in which each backward rank treads in turn in the footsteps of the more progressive pioneers.

Now if it be true that we have fallen on an age of great scientific progress, it will not do for the architect to ignore hard facts, and to be forever yearning for an impossible resuscitation of the past. In the imitative art of painting, the artist may ignore the present if he will; he may people his canvases with gods and goddesses; he may breathe the air of Arcadia or Elysium, and only return occasionally to the base sublunary ideas of modern life when he needs to find a patron or to examine his banker's book. To an architect such pure abstractions are impossible. He must be of his own time, and has no claim to existence unless he ministers to its requirements. Men do not build in order to look at their work, but to use it. Happy is he who can combine beauty and grace with perfect fitness; for he is the true architect, and in him art and science have met together.

Students of art who intend to become practical architects should bear this well in mind, and should not allow themselves to be unduly discouraged by the gloomy prophecies of failure, in which too many indulge with a facility which they almost appear to think stamps them at once as authorities. The past is ransacked, and its styles of architecture are paraded before us. What, we are asked, is your style? Why do you not give us something new? The question to some extent answers itself. Men worked on formerly in ignorance of the progress of others. Now originality is hindered by the affluence of knowledge. The results of long and painful experience are secured with one grasp, and our historical knowledge is the main hinderance to possessing a style of our own.

Originality in architecture is not only limited by such considerations as I have endeavored to explain in a previous lecture, but it is also now, as it has ever been, the divine attribute of genius. Architecture, therefore, as an "art of utility," cannot depend on the rare and uncertain appearance of original genius, however gladly she will ever welcome its advent. She has to take note of the accumulated knowledge of centuries, to strive after beauty while insisting on utility, and to guide her proceedings always with common sense. Unfortunately for architecture it is an art which cannot be indulged in without a more or less considerable expenditure; and with the increasing price of modern labor it must, in the highest forms, be out of reach of the multitude. And bear in mind that the great principle of modern social progress is care for the multitude; and their interests are now rightly placed everywhere in the foreground. There may be, and no doubt will be, as fine works of architecture hereafter as have ever existed in the past; but they may be obscured by the vast numbers of lesser things which are brought into existence to supply the wants of the masses.

We often lament — and, unfortunately, with good cause — that whereas the workman of old took a pride in his work, and showed an individuality in it, we look too often in vain for the evidence of such principles in modern work. Some ascribe this result to the introduction of machinery, but this is probably to confuse cause with effect. It is the *demand for labor* which has raised its value, and has brought upon us the necessity for economizing it as far as possible by machinery and labor-saving inventions. The world has obeyed the Divine command to increase and multiply, and the question has thus been raised, Is half the population to be without shelter in order that labor may be lavished on the remainder? Modern civilization gives a clear answer to this question, and the architect, as the servant of the latter, must strive to bring his art within the scope of her behests.

We have seen that in mediæval times the hewers of wood and the drawers of water were housed in the roughest manner, and this was also the case with the common people and the slaves in Rome and Greece. We have too much reason to be dissatisfied ourselves on this point; but much is now doing to remove the reproach, and there is consolation in the thought that when evils are admitted by the public voice their cure or mitigation in this country is seldom far distant. When this has been done, when our people have become well lodged, when education has begun to gather in its fruits of temperance, self-respect, and culture, I cannot but hope that art will have something to show for its share in the good work, and something to contribute to its further progress. If for us architects the days of castle-building be over, we may find a work, less showy perhaps, but as really noble, in educating the taste of an emancipated people.

MYCENÆAN ANTIQUITIES. — The treasures of Mycenæ discovered by Dr. Schliemann are soon to be placed in the Polytechnicon at Athens, under the auspices of the Archæological Society of that city, where they will be easily accessible.

BOOK NOTICES.

IRON AND STEEL STRUCTURES.[1]

THESE are two different translations of the same book. The method followed until quite recently in determining the dimensions of the component parts of iron structures has been to divide the maximum stress upon any piece by the assumed allowable stress on the unit of area, and to take the quotient as the necessary area of cross-section. When the piece was cut away by bolts or rivets, allowance was made for this, and the net or reduced area only was taken into account. Dr. Weyrauch very reasonably objects to what he assumes as the usual method of applying the above formula; viz., the assumption of the same allowable stress on the unit of area, whether the stress arises from tension, compression, torsion, or shear; and also whether it results from a constant or *dead* load, or from the repeated applications of a moving or *live* load, producing in many cases alternate stresses of opposite kinds. It seems unnecessary to state that such is not the practice of American engineers. Every boy, in breaking a piece of wire, bends it back and forth, instead of uselessly expending his strength in a dead pull; and yet Weyrauch intimates that previous to 1858, when Wöhler made his experiments, it was assumed that a body which could safely sustain a certain stress could resist the same stress, if indefinitely repeated. If this be so, what is the meaning of the terms, "proof strength," "working strength," and "ultimate strength," and the large factors of safety universally used?

Wöhler's law is thus enunciated: "Rupture may be caused not only by a steady load which exceeds the carrying strength, but also by repeated application of stresses none of which are equal to this carrying strength. The differences of these stresses are measures of the disturbance of the continuity, in so far as by their increase the minimum stress which is still necessary for rupture diminishes." The object of this treatise is to deduce formulæ based upon Wöhler's law, and the results of the latest experiments, by which the dimensions of all the parts of an iron structure can be rationally determined. The effect of phosphorus, sulphur, and varying proportions of carbon is discussed, as well as the mechanical treatment of tempering and annealing. Several chapters are devoted to riveting. Any attempt to apply theory to rivet connections must be based upon arbitrary assumptions. If we suppose the bars which are connected to be inelastic, then, except for the very great friction caused by the back rows of rivets, all the stress must be borne by the first row. Who can say how this stress is distributed over the back rows in consequence of the elasticity of the material, or the imperfections of workmanship? We can only rely upon the results of experiment.

While students will always desire to know upon what reasoning a formula is based, instead of simply adopting it, and working out results by mere substitution, practical men prefer a simple formula, or a table of results for reference. The latter class will not be likely to regard Dr. Weyrauch's book with much favor; the former may study it with profit.

In paper and typographical execution Wiley's edition is the superior, while Van Nostrand's translator presents the subject-matter in language which is much more terse, pointed, and forcible.

A PRACTICAL TREATISE ON HEAT.

No technical work that we know of better deserves its title than Mr. Box's treatise on Heat,[2] which has come to be accepted as one of the standard English authorities on the subject, grounded as it is in a great measure, on Peclet's famous *Traité de la Chaleur*. The first edition appeared in 1868, and during the past winter a second edition has been issued, which is based upon the first one, but to which valuable additions have been made in the chapters on Evaporation, Heating, Liquids and Air, Ventilation, etc. Any one who having a building to heat or a room to ventilate may refer to this work, hoping to find in it full directions of the course to be pursued in his particular case, will be disappointed. It has not been the object of the writer to stunt the faculty of ratiocination in his readers by an exhaustive series of explanations of treatment to be followed in all cases likely to arise in the practice of engineer or architect, but rather to stimulate it; for while considering the subject practically, he bases his reasoning consistently on theory, leaving the reader to work out his own conclusions. The book has the great advantage for the mass of readers of being couched in plain language, while its calculations and formulas are expressed in arithmetical and not in algebraic language; and for this reason alone deserves to be considered as one of the most conveniently practical of technical works.

In the treatment of those subjects in regard to which an architect would be likely to consult the book, as when he wishes to inform himself as to the best way to heat or ventilate a building, there is perhaps something to be desired in the form of a summary of methods and practices to be followed in ordinary cases, as well

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[1] Strength and Determination of the Dimensions of Structures of Iron and Steel. By Dr. Ph. J. J. Weyrauch. Translated by A. Jay Du Bois, Ph.D. New York: John Wiley and Sons, 15 Astor Place.

[1] Strength and Calculation of Dimensions of Iron and Steel Constructions. Translated from the German of J. J. Weyrauch, Ph.D. New York: D. Van Nostrand, publisher.

[2] A practical Treatise on Heat as applied to the Useful Arts, for the Use of Engineers, Architects, etc. By Thomas Box. Published by E. and F. N. Spon, London and New York. Price $5.00.

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as a corresponding group of the practices and devices that are to be shunned as being useless or of positive injury. But a careful reader will find after perusing the work, that he is in a position to deal intelligently with the problems he may encounter in his practice, and, understanding the principles of thermostatics and aërostatics, to weigh the merits of the devices and apparatus that practical inventors may bring to his notice, and have confidence in the judgment that he may form of them.

CORRESPONDENCE.

THE PERMANENT EXHIBITION. — THE MERCANTILE LIBRARY. — EXHIBITION OF THE ACADEMY OF FINE ARTS.

PHILADELPHIA.

A SLIGHT confusion of names and titles appears to exist in connection with the approaching post-Centennial show; for while the papers have been all along referring to it as the "Permanent Exhibition," and under this head have announced the programme for the order of ceremonies, the invitation to these opening ceremonies does not in any way suggest permanency, but calls it "The International Exhibition of 1877." The opening which is announced for the 10th of May will be, so far as the arrangements go, very similar to that of a year ago, — much the same distinguished guests, rather less chorus, and no doubt a decidedly smaller audience.

Great exertions are being made to obtain subscriptions to the stock, which appears to be held mainly by large wholesale business men in this city, to whom the unexpected decision of the Supreme Court in the matter of the Centennial loan was rather a damper.

It may not be out of place to mention that the architect and engineer of the Main Building and Machinery Hall has received the decoration of "Nisham el Iptihar," from the Bey of Tunis.

Among the new attractions to the exhibition was to have been a set of small houses, intended to illustrate the styles of building and domestic arrangements of several European countries; but it has been found necessary with one exception to abandon this project for the present. The German cottage will be the exception, and will be located under what was known as the English Tower, and facing the new music-stand. The design is by Messrs. J. P. Sims and T. R. Williamson. It is to be of red brick and timber construction, with low pitch shingle roof. Within two of the angles are open porches, with small verandas above, the roofs of which will be arranged as a flower-bed. The house is very small, but also very clever in detail, and thoroughly German in general character. There are two rooms on each floor. A very effective open stairway leading out of the hall is supported by a sort of arcade of timber construction. The large open fireplaces will be of red and enamelled brick, and, owing to the location of the house, will stand very little chance of being used.

An honest and effective dwelling, somewhat in the style called domestic French Gothic, is building at the south-west corner of Fifteenth and Walnut Streets from Mr. Hewitt's designs. The base and belt courses and arches are of North River blue stone. The main portions of the walls are of the local pressed red brick laid in dark mortar, decorative bands being laid in maroon, blue, and buff enamelled brick. Quite a feature has been made by rendering the whole of the basement wall to a height of some four feet above the pavement level in dark enamelled brick. This will effectively prevent that portion of the house which usually receives the attentions of a school-boy's chalk and pencils from being disfigured. The elevations show a basement, two stories, and very plain curb or mansard roof. The dormers are all run up in brick, with stone cappings. The cornice being in moulded brick, the gutter of copper, and the slate roof having zinc finish throughout, the building may almost be regarded as fire-proof so far as the exterior is concerned.

The repairs on the Mercantile Library are approaching completion. Almost the entire south side of the roof and ceiling have had to be restored. A view of the wreck after the fire suggested at least one valuable hint in the matter of roof-construction. This building was originally erected for a market-house. The roof was supported on curved lattice-beams acting as principal rafters; on these were laid heavy purlins, and on the latter the sheathing, and on this the tin. Until the building was bought by the Library this construction was all revealed; but when altered for its present use, a ceiling of lath and plaster was added to the under side of the purlins; this, it will be seen, allowed a succession of long air-spaces, which being opened in some parts by bits of falling wall and burning cinder, and not having been originally carefully closed off at the extremities, but too often opening into stripping or wall lining, gave the fire every facility for travelling from end to end of the building, without being affected by the water which was thrown on either roof or ceiling. Would it not be well worth while to stop off all such air-passages in buildings, or to provide some means by which their influence might be controlled or even utilized in cases of emergency?

On Monday, 23d ult., the Spring Exhibition of the Pennsylvania Academy of the Fine Arts was opened. The display can hardly be considered first class; and local, indeed, one may even say national talent, is conspicuously wanting. Not a little space is filled up with those pictures which the owners have consented to allow to remain in place after the close of the exhibition of the loan collection. Architectural designs rarely seem to find their way into these Academy exhibitions; and when we consider what a feature they form at the *Salon* in Paris, and at the exhibitions of the Royal Academy, London, to say nothing of their always being represented at the Academy of Design, New York, one naturally asks, Is the oversight due to the apathy of local architects, or to the disinclination of the Academy management towards that sort of thing? Almost the only architectural features of the present exhibition are certain large models in cork, — Windsor Castle with St. George's Chapel, the Tower of London, the Abbey Churches of Westminster and Melrose, Holyrood Palace, Stratford Church, and the Scott Monument, which are contributed by the cutter, Mr. Hoppin. It seems to be pretty well understood that Hans Makart's large picture, "Catherine Cornaro," which is still on exhibition, will again go begging for a local habitation, as it seems to be impossible to raise even a fraction of the sum demanded for its purchase.

The two works by the same artist well known by the photographs, the "Abundantia" (of the earth, and of the water), which hang in the entrance-hall, while not so large or imposing have even more merit in the fact that they are more truly pieces of decorative art; considerable portions of the background being gilded.

VENTILATION.

THE attention of the writer was called to an article, signed "Champlin," in the *American Architect and Building News* of March 31, on this subject, in which the "Tobin system" of ventilation is noticed with some approval; together with a reference to an opinion expressed by the present writer as to the application of the "system" to the Hall of Representatives, Washington, in a report which he prepared a year since on the ventilation of that hall. The concluding paragraph of the article referred to alludes to the present writer by name; and the last sentence reads, "I am not prepared to discuss the merits of this [the Tobin] system, but the architect who could not introduce Tobin pipes in a sightly manner must be wanting in constructive ability."

The information as to the ventilation of the Leeds Borough Police Court is quite meagre. All we know is that there exists a room of some size, not given, in which an unknown number of persons is usually collected for an uncertain length of time each day, and this room is supplied with an unknown quantity of air, through eight pipes which are five inches in diameter, located in different parts of the room, and which open into it four feet from the floor, and discharge self-induced currents of air of low but unascertained velocity. Coupled with this indefinite information are the averments that "no draught whatever is now felt in the room, except when one puts his hand directly over the open mouth of one of the vertical shafts, and the air inside of the court is as pure and sweet as out of doors." The information as to St. George's Hospital is more positive in degree. A ward containing nine beds has four tubes, which are semicircular in section, being half of five-inch pipes, and consequently have nine and a half square inches of cross area for each tube; through either of which the current is "*perceptible*" with some apparent variation amongst them as regards the velocity of entering air. "The air remains sweet at all hours with the doors closed."

With this modicum of knowledge as to the practice of Tobin's system it will be well to recur to Champlin's theory, which it may be accepted to have carried out. "(1) We must secure an ample supply of fresh air. (2) The vitiated air must be removed at once. (3) The air in the several parts of the room must be of uniform temperature. (4) There must be an entire absence of draughts." Applying these rules to the ward in St. George's Hospital, "ample supply" for a least quantity may mean 30 cubic feet of air to a person per minute in the coldest weather of winter, and 60 cubic feet, similarly, when the temperature of the external air reaches that point where doors and windows must yet be closed, and little or no interchange of air occurs at the cracks or through the walls of the building, and when the conditions of internal and external air as to quantity of moisture present do not invite the diffusion of aqueous exhalations. Assuming these quantities, and we can do no less, let us see what velocities of air are now requisite to proceed out of the four (half) tubes allotted for the nine beds. 270 to 540 cubic feet of air per minute must enter at four inlet mouths of 39.27 total area, — 815 to 1,630 feet velocity of flow per minute, for a self-induced current. 120 feet per minute for air of unaltered temperature is a perceptible current. It may be admitted that currents of air at these computed velocities would be *perceptible*, and in so far the observations at St. George's Hospital are not to be questioned.

Admit these blow-pipes to be effectual in the attainment of "sweetness of air at all hours;" let an equal number of them be supposed to be distributed over the surface of the floor of the Hall of Representatives, — four to each nine members, — or take two whole pipes in lieu of the four half pipes for the nine members, and there is to be furnished a five-inch stand-pipe in every sixty-four square feet, or interspaced at eight feet distance apart on the floor, while in the galleries the same pipes must be placed only five feet apart. After this statement for the position of these pipes, I

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yet hold to the opinion they would be quite unsightly, and would prove a severe trial to the constructive ability of the architect.

But I think the fact of the sufficiency of the supply of air by means of these small tubes, without the resort to fans or pumps to force the delivery, may properly be questioned. The existence of the tubes both in the Leeds Borough Court and in the wards of St. George's Hospital may be indubitable; but it may be relied upon, if the air is sweet, some surreptitious supply insures the volume necessary. If the air in these rooms has uniform temperature from floor to ceiling, either some miracle has been performed, or the source of heat for the air below the mouths of the tubes is not the entering and supplied air. If there are no draughts, the velocity of entering air from the tubes and the consequent volumes of air introduced must have been much less than my computation for "*sweetness*," and not over one-fifth to one-tenth what is demanded by that computation. The constructive architect who will supply sixty cubic feet of air per minute to each of the members on the floor of the Hall of Representatives who occupies fourteen square feet of floor, and to each of the audience in the gallery of the same hall who has allotted four and a half square feet of floor, "without the flicker of a candle," will have solved the problem to every one's satisfaction.

I have met with many instances of *perfect* ventilation in various places, and have examined the methods by which they were attained. They have frequently followed some extensive but incomplete devices for supplying or exhausting the theoretical volumes of air requisite for health, which have been devised or operated with little regard to the comfort of the subjects for ventilation. The "Quest of the Sultaun Solimaun" in search of happiness has involved the catastrophe of my investigations. I did wish to clothe myself with the knowledge of how to accomplish a perfect ventilation without cost or care. They found the happy man; but, alas! Paddy had not a shirt to his back. The perfectly ventilated plan was devoid of air-supply.

These remarks are intended to combat the specific assumption or inference that the "Tobin system" has reached a development which would justify its use at the Hall of Representatives, with its enclosure of three lines of external wall, its crowds of audience, and its sessions of thirty or forty hours continuously. I have merely endeavored to support my pamphlet on the condition of the ventilation of this hall in 1876. I am tempted to add some comment on the views set forth as to ventilation in general. The writer has been for twenty years combating the notion of the poisonous or even deleterious nature of carbonic acid gas; and now all physicists have come to the admission that it is as harmless as water, and as unsuitable to breathe, and that the source of effluvia as well as of malaria in habitations is organic matter proceeding from personal exhalations accompanied by moisture. The carbonic acid gas present in any dwelling may be made *the measure* of vitiation, as the constancy of proportion in the open air admits of positive measurement or separation of the excess in any room or place, and this excess represents the precise quantity of exhalation not diffused at a certain time, and bears some, although a very indefinite relation, to the organic vitiation. Even carbonic oxide gas is overrated in popular chemical esteem as a source of danger. It rarely exists at all except at the top of a chimney, and when diffused in the small quantities emitted by imperfect combustion of gas or other lights, it is quickly modified into carbonic acid; and, on the other hand, its presence in excess has instantaneous effect in discomfort, nausea, or coughing, while the whiff of breath before these disagreeable incidents is not fatal or even dangerous. Carbonic oxide gas is by no means an insidious poison, and the observations made where it has been manufactured in large quantities as a basis of illuminating gas have permitted its effects to be shown conclusively.

The question of the least size of room to be allotted for prisoners, for sick persons, to the poor, and to soldiers, is based not on ventilation, but upon the absence of ventilation to the greatest extent. How small a room practically unventilated will suffice? In the dormitories of the poor, the question of warmth only is considered; and nothing but habit or education will allow the cold bedroom which some vigorous mortals glorify themselves upon enduring. There are those who seriously question if the furnace-heated chambers, with enormous excess of air for ventilation, are as healthy as the old close cold rooms pre-historic to the anthracite coal era. All these questions open out trains of thought which it might prove entertaining to pursue, and they should be followed out by architects who have to provide for the ventilation and warming of buildings; bnt the length of this paper warns me to conclude abruptly. ROBERT BRIGGS, C.E.

NOTES AND CLIPPINGS.

THE OLYMPIAN EXCAVATIONS. — The latest discoveries at Olympia include a marble group of four persons, which is supposed to belong to the second century of the Christian era. Of the western pediment of the Temple of Zeus eighteen figures, and of the eastern pediment twenty-one figures, have been recovered, many of them, however, in a fragmentary condition. It is now conclusively shown that the Byzantine church, which stood near the Temple of Zeus, was erected on the site of the ancient Hippodameion, — temple of heroes.

CORNER-STONE LAID. — The corner-stone of St. Joseph's Cathedral at Hartford, Conn. was laid on the 29th ult., by Archbishop Williams, assisted by Bishops Conway of Albany, Shanahan of Harrisburg, O'Reilly of Springfield, Loughlin of Brooklyn, Galberry of Hartford, and some fifty priests.

A NEW CATHEDRAL. — The Episcopalians of Brooklyn are about to build a cathedral for Bishop Littlejohn, and they have now a bill before the Legislature to incorporate "The Cathedral of the Incarnation."

BRICKLAYERS' STRIKE. — The bricklayers of New York, numbering about 1,500, struck on the 30th ult., for an increase of wages from $2 to $2.50 per day. It is stated that twenty-seven firms have given the increase demanded. Four firms are reported as refusing the increase, and the men employed there have quitted work. The total number of men now out on strike is only 110.

THE HIGHEST RAILROAD BRIDGE IN THE WORLD. — The Cincinnati papers are giving accounts of the opening of the new Southern Railroad from that city to the Kentucky River, where there is said to be the highest railroad bridge yet built. It is 275 feet high, having three spans, the middle one 375 feet long, and the others 300 feet each, the total length being 1,125 feet. There is a bridge in Switzerland which is 254 feet high, but with span only 144 feet long, and one at Varrugas in the Andes, 252 feet high, with spans 125 feet long. The piers of this Kentucky bridge are the largest in the country, except those at Brooklyn, the stonework being 130 by 47 feet, and the base of the ironwork 117 by 28. The frame is all wrought iron, and was built out from the abutments toward the centre of each span. The fastening of the junction points was accomplished in a novel way. One sunshiny day having expanded the framework, the connecting bolts were fastened, and so much secured; then, a second day of sunshine having given all the expansion the bridge was capable of, the bolts were made fast permanently. At the opening the other day, the bridge was subjected to seven severe tests, and stood them all admirably.

THE NEW YORK COURT HOUSE CONTRACT. — The *Times* says it is charged that the New York Court House commissioners, while limited by the board of apportionment to expenditures of $105,000, have accepted contracts to the amount of $381,000 for the completion of the south portico and interior of the rotunda, including the supports of the dome. When this money is exhausted, there will, it is said, be an effort to procure a further advance from the city of $400,000 or $500,000 additional. Cost of the work will thus be augmented to nearly $1,000,000. The cost to January, 1872, when the work was suspended in consequence of the breaking up of the ring, was $12,420,732.

THE REJECTED FATHERS. — The four statues of the fathers of the Latin Church, which the Dean of Bristol Cathedral compelled Mr. Street to remove from the north porch of the cathedral which he was restoring, have at last found a resting-place (one might in view of their position say a roosting-place) on East Heslerton Church, Yorkshire, which has been restored by Mr. Street at the cost of Sir Tatton Sykes. There is a saying that "every thing suffers by translation but a bishop," which in this case is probably falsified, for the four figures are now used as terminals to the pinnacles at the top of the tower.

A PARALLEL CASE. — The circumstances that led to the removal of the statues of the Latin Fathers mentioned above have been paralleled in London where the Bishop of London refused to consecrate St. Agnes Church, Kensington Park, last January, unless a certain figure in the large stained-glass window above the chancel was removed. The figure was a full-length representation of the Virgin, surmounted by a crown of glory, and surrounded by a halo, placed side by side with a figure of the Saviour, also surrounded by a halo. The objection was that in the figures as shown in the window, the same honor was shown to the Virgin Mary as to the Saviour. The objectionable figure was removed, the space was filled in with plain glass, and the church was consecrated. During the first week of April the figure was replaced in the window with the bishop's consent. The crown about the Virgin's head had disappeared, but the halo remained.

THE BINNENHOF. — The Dutch as well as the English are at present interested in the question of the preservation of ancient monuments, and several historic buildings are being carefully restored; amongst others the Binnenhof or Court of the Counts of Holland at the Hague, where took place the arrest and execution of the Grand Pensionary of Holland, John Van Olden Barneveldt, the chief founder of the Republic. The picturesque group of buildings in which is the Binnenhof dates from the thirteenth century. The Dutch Government have also undertaken the restoration of the ancient feudal castles of Bréderode, near Haarlem, and Muiden.

FIRE IN JAPAN. — One thousand houses were destroyed by fire in Tokio, April 6.

LET WELL ENOUGH ALONE. — It is related of Cardinal Antonelli, that when some well-intending though meddlesome member of the British Academy of Fine Arts at Rome discovered that drawing from the nude female figure as practised by members of the academy was against the law, he thought it would be a good safeguard to get a special permit from the cardinal. "*Figlio*," the cardinal exclaimed, "I was not ignorant that the female model posed in your academy; but you were perfectly quiet, your rules excluded Italians from membership, you made no scandal, and I was not obliged to know any thing about the matter. Now, however, should the practice be continued in future, I shall be compelled to close your school."

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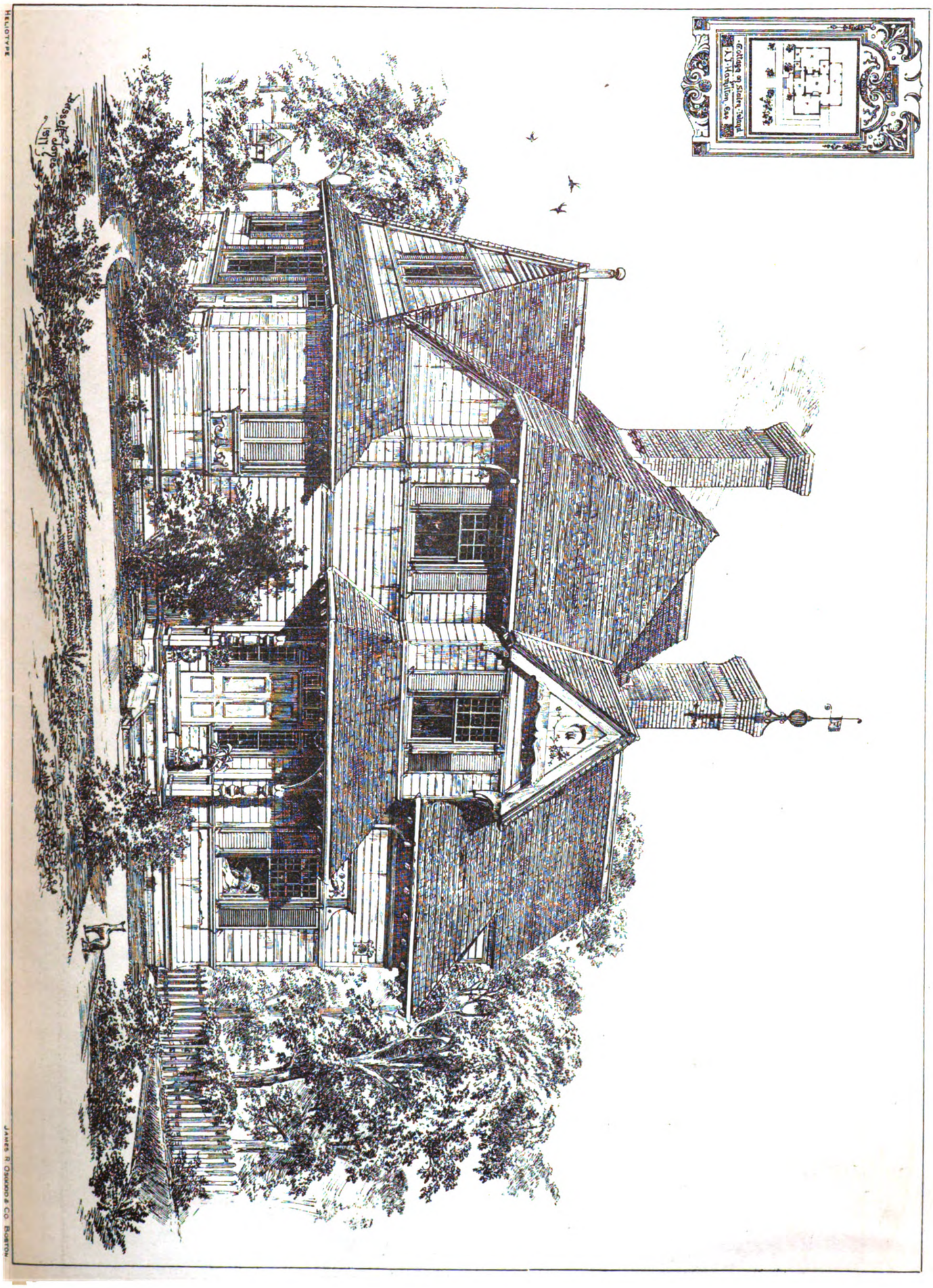

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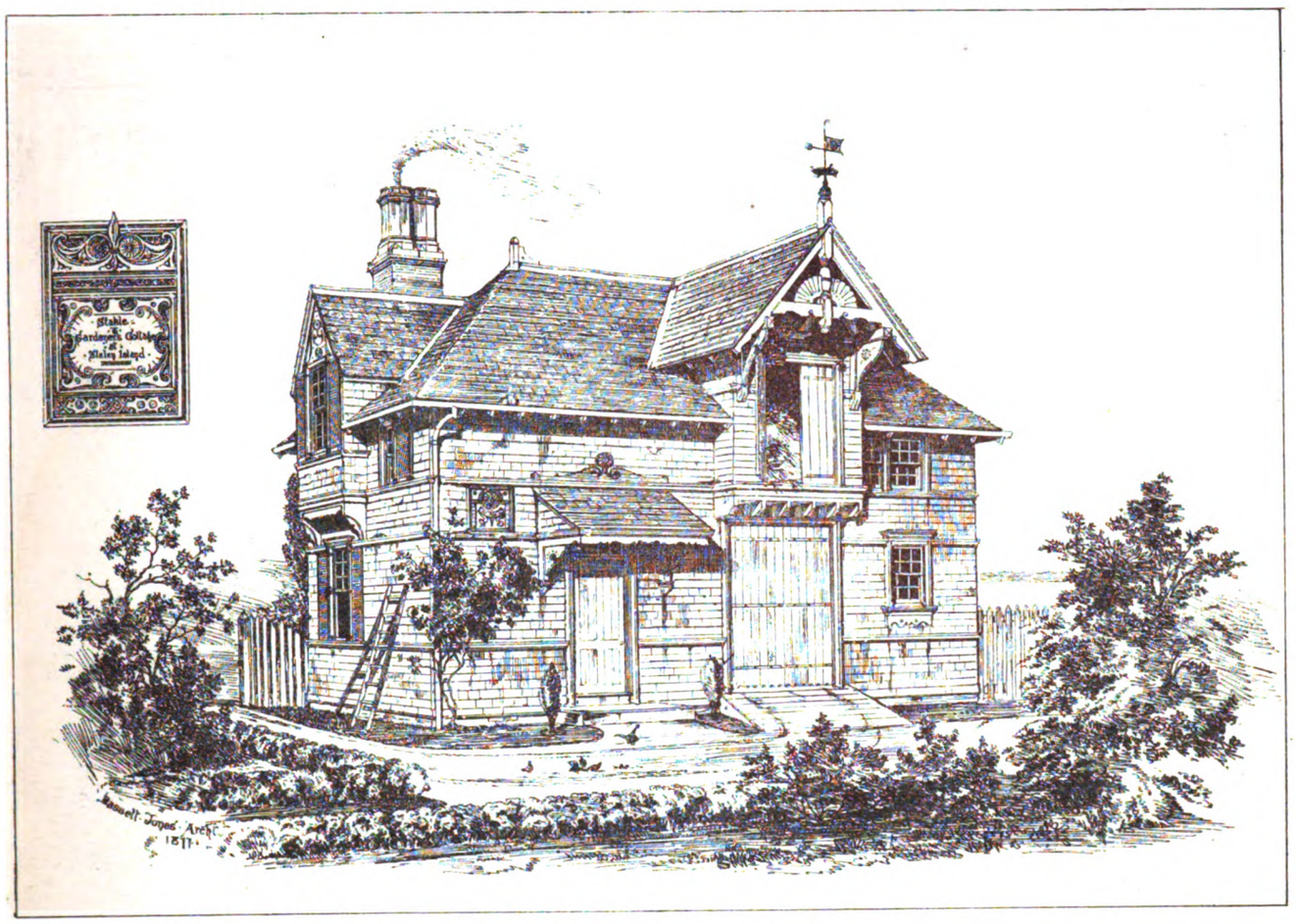

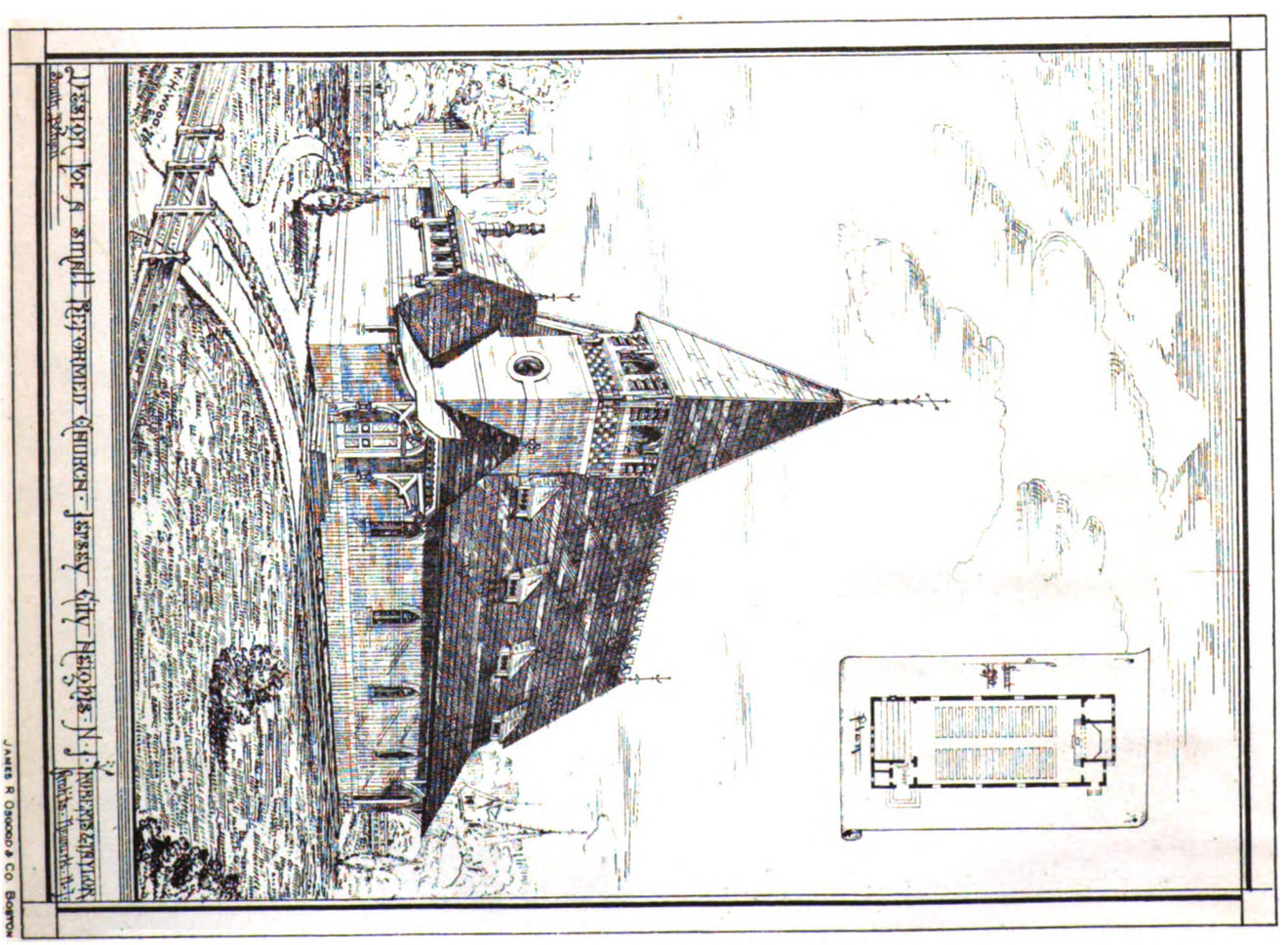

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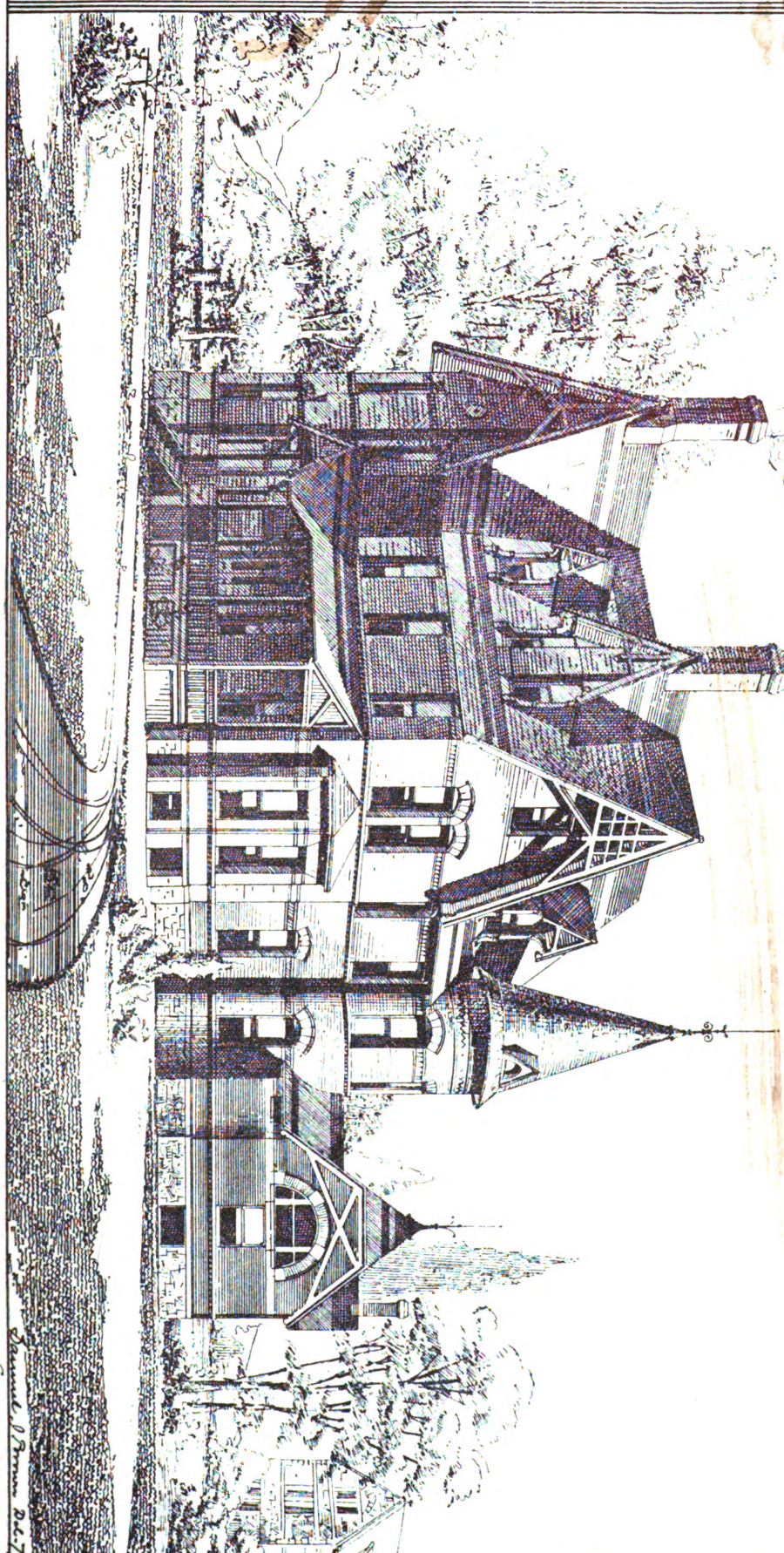
HOUSE FOR PROF. I. D. RUNKLE, BROOKLINE, MASS.



First Floor Plan

Second Floor Plan

Samuel J. Brown Del. 77

Wilson & Rantoul Architects
Boston, Mass.

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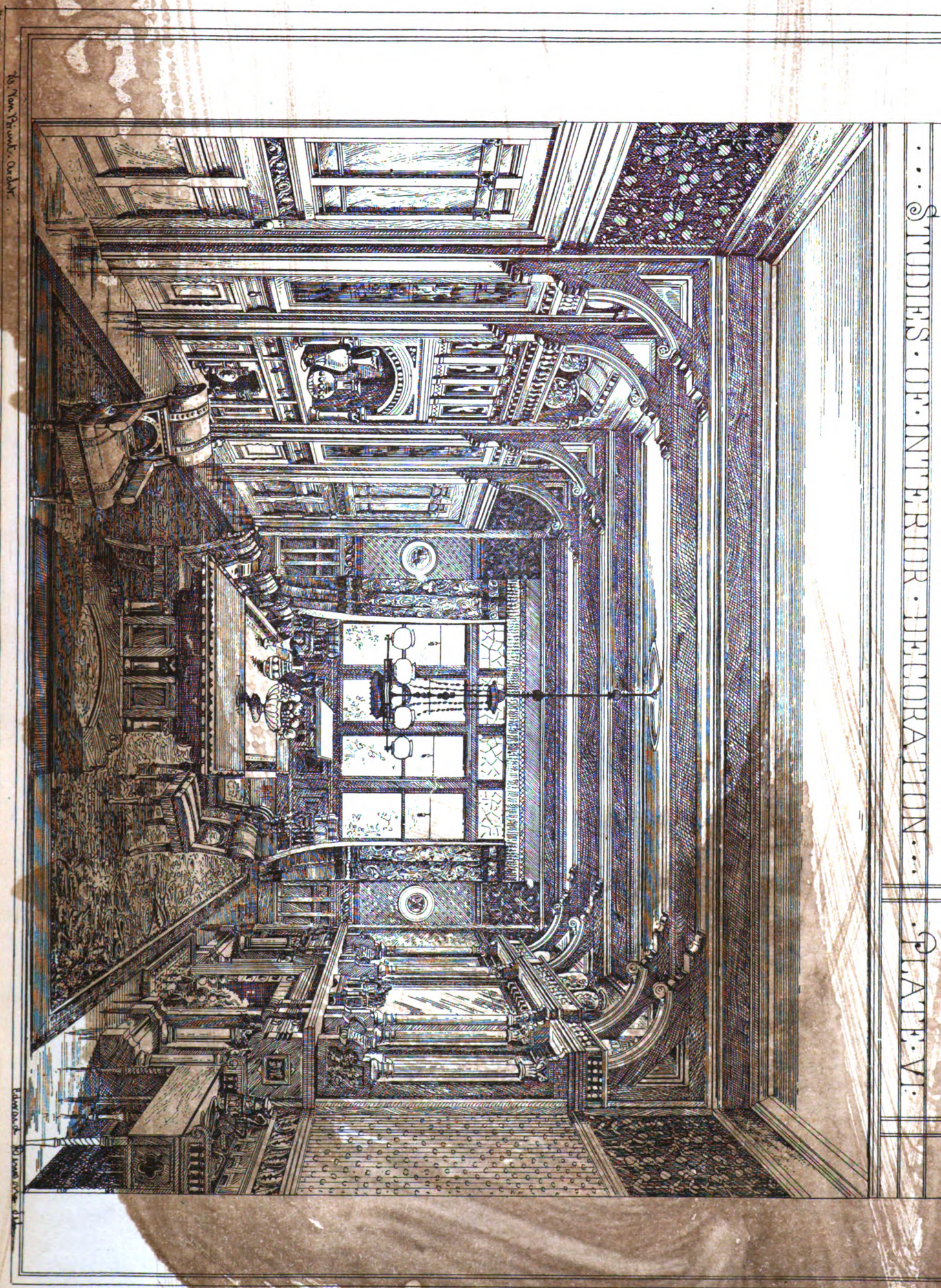

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, MAY 12, 1877.

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THE fall of a part of the roof of the New York Post Office, killing four men who were at work upon it, has made a great excitement in that city, which has been increased by the animus with which the discussions on it have been conducted, and by the conspicuous position of the officials who are concerned with it. What was the immediate cause of the fall, it is not yet time to decide, but the known facts are substantially these. Before the retirement of Mr. Mullett from the office of Supervising Architect, it was thought necessary to enlarge one of the rooms in the intermediate stories of the Post Office building for the use of the Criminal Court; and a brick cross partition in the third and fourth stories was taken down. The upper portion of this partition, in the fifth story, on which rested a section of the roof, was left standing, supported by the iron beams of the floor. The roof was very heavy, being of iron beams, carrying arches of corrugated iron, the haunches levelled up with concrete, of which a layer covered the roof; on the concrete was a layer of cement which was covered with copper. The beams in the fifth story floor deflected under their load, and it was decided to remove the wall in this story, replacing it by a truss which should support the roof and relieve the floor-beams. A truss was provided by direction of the Supervising Architect Mr. Hill, of the same form as three or four others in similar positions in the building, and had just been put in place after taking down the brick wall, when, on the removal of the shores that had supported the roof, the truss gave way at once and fell with its section of the roof, as our readers know.

THEORIES of the reason of the failure conflict. It is of little use to expect to decide among them until the investigations which have been set on foot are concluded. Mr. Hill declines to give his opinion on the matter while the investigations are pending, a reticence which it would be well if other officers of the government would imitate. The superintendent of the building, Mr. Oakshott, thinks that there must have been a fault in the truss, which was made by Messrs. Heberman and Haven of Trenton. We do not know whether the other similar trusses in the building were made by the same persons. Mr. Mullett's theory is that the truss must have been wrongly placed. The newspaper reporters make Mr. Mullett say some singular things about Howe and suspensory trusses. It does not appear that any part of the building was disturbed by the casualty except the truss and the portion of roof that bore on it: the truss itself, it is said, was thrown to one side and twisted out of all shape. We see no recognition in any of the papers of the rather remarkable and gratifying fact that the floor of the fifth story was not injured by the tremendous shock of the falling mass. We think there are very few buildings in which the floors could have stood such a test. The composition of the coroner's jury, which includes four of the ablest architects of New York, gives assurance of a thorough and intelligent investigation, and the examination ordered by the Secretary of the Treasury will doubtless be searching. For these we can afford to wait; and the public may congratulate itself, with the belief that whatever may happen in the case of private bridges, theatres, and hotels, in the public service at least, the responsibility for such casualties will not be slurred over, or the offenders, if they are found, unrewarded. The reports received from the coroner's inquest as we go to press are that Mr. Hill's examination of the truss after its fall showed it to have been faulty in construction, having been copied by order, and incorrectly, from those which were already in place, and not carefully examined before it was set.

WE have received the pamphlet on the foundations of the Washington Monument published by the Joint Commission. The showing is not to the credit of the enthusiasts who have coaxed and urged Congress and the country with such eagerness to finish it. The building of the monument was undertaken in a very reckless way, and there were apprehensions of danger almost from the beginning. No tests were applied to the soil on which it was to be set, which was a tolerably firm alluvium, except by digging a well and inspecting the earth through which it was sunk. The monument was to be six hundred feet high, and the bottom of its foundation was made eighty feet square, which would have loaded the earth, according to the computed weight of the superstructure, with eleven and a half tons to the square foot, — a pressure to which that of the Great Pyramid, distributed over the enormous area of its base, is small. The beds of the foundation stones were not dressed, and the uneven joints were pinned up with small stones, filled with mortar and grouted, as in ordinary foundations. The marble facing of the shaft was worked to a fine joint a little way from the face, and then was roughly dressed back on a bevelled bed, leaving a wide joint to be filled with mortar, and throwing the pressure on the face of the stone. The backing was of loosely laid rubble containing a great amount of mortar, and ready by its settlement to bring an enormous weight on the close joints of the facing.

THE work, begun in 1848, came to a dead stand in half a dozen years, the funds of the association being exhausted. The safety of the monument was already questioned when in 1859 a new movement in its behalf was authorized. In that year Lieut. Ives of the Topographical Engineers reported to Congress that the edges of the facing had yielded to the pressure at the joints, and were chipped. He had not however noticed any settlement of the building, and considered the project a safe one. But before any thing was done the war intervened, and it was let alone again for a dozen years and more. When the Centennial Exhibition was projected, it was thought desirable to finish the monument in time for it, and in February, 1873, the Secretary of War ordered a new examination of its condition. Lieut. Marshall of the Topographical Engineers reported that the spalling of the lower courses of the facing had continued, and that some of the blocks had cracked; also, that some of the foundation stones of blue gneiss had split, and that the upper foundation course had an inclination to the north-west. In his report appears for the first time, we believe, the suggestion to substitute for the circular colonnade, or "Pantheon," that was to have encircled the base, but had apparently by this time been given up, a terrace two hundred feet broad and seventeen feet high, something of the kind being thought necessary to cover the foundation courses which showed above ground, and the injured facing about the base of the shaft. He concurred nevertheless in Lieut. Ives's opinion of its security. A year later, in the spring of 1874, at the request of a committee appointed by the House of Representatives to consider the matter, Lieut. Marshall was ordered to make a more minute examination, and report as to the safety of carrying out the work. He found that the top of the monument inclined an inch and a half to the north-west, an inclination which corresponded to that which he had before noticed in the foundation. He reported that the soil under the monument was a somewhat compressible mixture of sand and clay, and that it was loaded with a pressure of nearly five tons per square foot. The foundations themselves he reported as faulty in construction but probably sufficient, and the masonry of the shaft poor. He recommended that the height of the shaft be reduced one-third, from

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six hundred feet to four hundred, that it be built with thinner walls and lighter materials. Being pressed by the chairman of the House committee for an explicit opinion, he gave his judgment that it would be safe to build as he proposed, but added that the weight upon the soil would "still be about twice as great as the maximum usually considered proper for such foundations." This report was referred to the Board of Engineers for Fortifications, Gens. Barnard, Tower, and Wright. Comparing the facts in the case with those of other structures on similar soil, they decided that five tons per foot was "an excessive pressure for soils composed of clay and sand," and declined to recommend placing any additional weight on the monument. Gen. Humphreys, the Chief of Engineers, thereupon submitted the reports, recommending that architects be invited to suggest some way of finishing the monument without adding to its height, and that more careful examinations be made of the soil on which it stands.

ON the strength of these reports the Monument Association revised their design, and proposed to make the monument four hundred and eighty-five feet high, with a terrace two hundred feet broad and twenty-five feet high about its base. They besought the people of the country to give their money for it, and beset Congress to grant them a subsidy. The centennial came, and the building of the monument was not resumed; but in last August a bill was passed appropriating two hundred thousand dollars to help finish it, coupled with the proviso that a thorough examination of the foundations should be made, and that if they were found inadequate the appropriation should lapse. The report of Col. Kurtz and Gens. Duane and Gillmore, in response to this order, is the decisive part of the pamphlet. They speak of the foundations as "rubble masonry of inferior quality," in which the joints are pinned up with small stones and liberally filled with mortar. The facing of the lower part of the shaft presents "an unsightly and discreditable appearance." The shaft has a slight inclination toward the north, the dip of the foundations being greater, probably, because the effect of their settlement was partially corrected as the shaft was carried up. By referring to a bench-mark fixed by the architect of the monument, Mr. Robert Mills, they find that the whole structure has settled bodily nearly nine inches. They have carefully tested the subsoil, which is a mixture of sand with a large excess of compressible clay. Four holes were dug on the four sides of the monument, and prisms of the earth taken from below the level of the foundations were submitted to pressure. Under a weight equal to that imposed by the original design, the earth confined in a close box was compressed by five per cent of its depth. They show that the history of other structures on similar soil indicates that even the pressure of the monument as it stands is in excess of what has usually been found safe, and they sum up their conclusions by saying: —

"That the stratum of sand and clay upon which the monument rests is already loaded to the limit of prudence, if not indeed to the limit of safety, and that it does not offer sufficient resistance to compression to justify the completion of the shaft in accordance with the modified design, or any other design that will load the underlying soil beyond ten thousand pounds per square foot.

"That additional weight imposed at the top of the structure would in all probability cause additional, and possibly extensive spalling and splitting in the ashlar facing near the base.

"It is evident that the masonry foundation was not given spread enough to carry safely the weight it was designed to place upon it. . . . There has been actual compression of the soil to the extent of between eight and nine inches. The shaft is sensibly out of plumb, and the foundation courses show increasing departure from horizontality." The friends of the monument have, as is known, shown some disposition to fight the report; but we presume it will give the undertaking its quietus. At least it must put a stop to the use of the appropriation voted by Congress. The question remains, what shall be done with the stump.

THE buildings for the Paris Exhibition of 1878 are growing rapidly. On the Champ de Mars the foundations are laid. The angle pavilions, which are of masonry and fifty feet high, are ready for the iron domes that are to cover them; and the walls of the central gallery, which is likewise of masonry, and intended for the fine arts exhibition, are almost finished. The piers of the rest of the building are ready for the superstructure of iron and glass. On the Trocadéro, in spite of the great difficulty of laying the foundations on the hill undermined by quarry-galleries, the two elliptical wings are built, the substructures of the great towers are laid, and the masonry of the central rotunda is finished. Two thousand men were employed upon the works; and up to the 1st of April, 1,800,000 francs had been expended upon excavation and masonry; covering 158,000 cubic mètres of excavation, 30,000 cubic mètres of concrete foundations, and 35,000 cubic mètres of masonry. Six miles of pipes and sewers had been laid.

THE question of disposing of the building on the Trocadéro has been one of some difficulty. Since the land belonged to the city, while the building was to be erected at the cost of the state, the city had at first exacted from the state an agreement to remove the buildings, and restore the ground to its original condition, at the end of the exhibition. It was afterwards agreed, when the proposal was made to build a permanent hall, that the city should either buy it on certain conditions, or allow the state the use of the ground rent-free so long as the building was maintained for public uses. An agreement has at last been made, under which the building is to remain, with the conditions that the galleries shall be kept open to the public, that it shall be lighted (and we suppose maintained) at the charge of the city, and that within six months after the closing of the exhibition, the city shall decide whether to purchase the building at the price of three million francs, to be paid in six annual instalments, or to cede the ground on which it stands to the state, in the understanding that the gardens about it shall be restored, and that the great cascade and the aquariums shall become the property of the city. The palace, as it is called, is to be used for election-meetings, for sessions of the mechanics' syndicates, for public lectures, and for the establishment, if it is accomplished, of museums of ethnography and of historic and prehistoric archæology. This decision is not reached without opposition from persons who argue that the Trocadéro, being remote from the centre of the city, and unfrequented, is not the place where a permanent building will be of public service.

BERLIN AND ITS BUILDINGS.

[Second notice.]

IF there were natural obstacles, as we said in our first notice of this book, in the way of making Berlin a great city, there were apparently even greater ones in the way of making its architecture great. It was, at the time when its kings first undertook to embellish it, a city without architectural traditions. It had been too insignificant during the great building epochs of the middle ages to have any valuable heritage of famous buildings which could shape the architectural instincts of its population. That population, gathered from all quarters, was too miscellaneous to have any such instinct in common. The architecture that is imposed upon a city in such a case is not likely at first to sit more naturally than the coat which one buys at a ready-made shop. It must almost necessarily be either entirely formal or eclectic. The day of eclecticism had not yet come, and the formal Renaissance of the seventeenth century was not out of keeping with the rather stern rule of the monarchs who encouraged it. Art was exotic, and the architects themselves, like the inhabitants, were during the seventeenth century mostly importations. Among the names of the chief architects of that period whose names are given in the introductory chapters of *Berlin und seine Bauten*, we find Dutchmen, Swedes, Frenchmen, Italians, and others from nearer home, — Schleswigers, Saxons, — but rarely a Berlinese or even a Brandenburger. Nehring, the busy architect of the Great Elector, to whom the greater part of the architecture of the seventeenth century in Berlin was due, and of whose work the *Parochialkirche* and *Zeughaus* still survive, was a Dutchman. Schlüter, his more famous successor under the first king, was a Hanoverian sculptor and architect. Berlin is still proud of

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his works, the enlargement of the Royal *Schloss* and the statue of the Great Elector, as well as of the unexecuted designs which he left behind, and recalls with sympathy his sudden disgrace at the hands of a king whose ingratitude to his servants was a proverb, after the constructive failure of the *Münzthurm* which he had added to the *Schloss*. Knobelsdorff, the architect of the Opera House, the Palace Theatre, and of portions of the palaces of Charlottenburg and Sans-Souci, Boumann who built the Domkirche, Gontard and Langhans — all were foreigners.

There were other difficulties in the way of the architectural development of Berlin. The nation was young and not wealthy, its population and therefore its fiscal necessities increasing faster than its income; and a heavy drain was on its finances from the long wars of its vigorous monarchs, while their ambition for splendor was tempered by frugality. The most ambitious schemes for the adornment of the capital were checked or marred in execution by want of money. Another want, almost as obstructive to architecture, was the want of good building-material. The alluvial plain in which Berlin is situated furnishes none, or next to none. The one available quarry, at Rüdersdorf, fifteen miles from the city, yields a fossiliferous limestone which serves for foundations and for lime-burning, but which it has not been found worth while to use freely in architectural work. Erratic boulders of granite, which were found scattered over the plain, furnished the material for some of the few mediæval buildings which remain wholly or in part to the present day, and later for paving the streets of the town; but these have long ago been picked up as carefully as the farmer picks the stones from his cornfield. So long as transportation was difficult and costly, this lack of material was an almost insurmountable difficulty in the way of a rich and substantial architecture. The Magdeburg sandstone which was used to some extent in the older buildings proved perishable; and some use has been made of sandstone from "Saxon Switzerland," of which the famous Brandenburg Gate by Langhans was built, but which like the other was thought too costly for any thing but what are vulgarly called, in milliner's phrase, the "trimmings" of buildings. Even Schinkel was obliged to see his most famous works executed in inferior materials. It is said in the book before us that till within the present decade the Brandenburg Gate was absolutely the only building in Berlin whose whole exterior was of stone. Since the French war a good deal of French stone has been imported, and with the increase of luxury and wealth stone buildings are becoming common.

There was abundance of clay and sand about Berlin, and abundance of limestone in the quarries we have mentioned; and so the city became in its mediæval days a city of plain brickwork, of stuccoed brick in the Renaissance period of its prosperity. Brick is a sufficiently neutral material, stucco hopelessly so; and in this respect also, Berlin lay quite at the mercy of whatever foreign influence might bear upon her architecture. That influence was exclusively Italian. The architects who were imported were mostly of Italian training. Those with whose education successive kings occupied themselves were sent to Italy to study; and the result is that Berlin architecture shows but little of such modification by local influences as befell Italian architecture imported into French or even English cities, and is in fact more characteristically Italian than that of any other northern city that we recall. It is much to its credit, to whatever influence it may be owing, — the moderation of individual architects, the general sober taste of the community, or the restraining hand of severe and frugal kings, — that the dangerous facility of stucco has not inclined it to license; and if it has been somewhat dry and formal, it has at least escaped the greater evils of extravagance and tawdriness to which stucco architecture is prone. With such materials and with such influences of style, Berlin would naturally not offer any great hold to the rationalistic doctrines of architecture that have made so much impression on England during this century. The gospel of constructive architecture has hardly been preached there: The monumental aspect of buildings has had almost exclusive attention, and the desire of the rationalistic critic to read in the front of a building the indication of what is behind it, would be starved in Berlin. To this day it is hard to find there a building in which a façade is any thing more than a façade; or in which any but purely "architectonic" considerations have had an effect, or even one which is not rigidly symmetrical.

The architectural interest of Berlin really begins with Schinkel's works. Painter and architect, the apostle of the Greek revival in Berlin, he exercised more influence on the architecture of this city than any other man. An annual Schinkel Festival of the Architectural Association, and annual prizes for designs given in his name, are witnesses of the abiding reverence in which the name is held. The new guard-house, the old museum, and the great theatre, are the most interesting and characteristic of his works to travellers, and are monuments of the elegance and freedom of his invention in the adaptation of Greek forms to modern uses, altogether free from the rigid pedantries that marked the earliest Greek revivals in other cities. Unhappily they suffered from the lack of good material and the exiguity of means that characterized Berlin. The guard-house, one of the most elegant of Schinkel's elegant designs, is of common brick, embellished with stone; the museum and theatre are of stucco. The floors and roof of the museum are combustible. The Bau-Akademie, one of his latest works, marked, as it were, a new departure, in which he made a characteristically original attempt to adapt his design to the materials which his neighborhood furnished. It is built of brick and terra-cotta, and is more attractive for the interest of its detail, and as a pioneer work, than for its happy architectural effect. Its suggestions seem to have been more followed elsewhere than in Berlin. But from Schinkel's time a great change has come over the architecture of his city, bringing a great advance in freedom and elegance of detail, in which Greek influence is strongly marked, and also a greater liberty in composition, though the old classic firmness and rigid symmetry of arrangement is scarcely relaxed.

We have left ourselves no room to speak in detail of the buildings of Berlin, for which, in fact, our limits were quite inadequate. For this the reader cannot do better than consult the book itself. He will find in it valuable and interesting solutions of some of the prominent problems of the day. For the planning of congregational Protestant churches, for instance, he will find useful lessons in the modern churches of Berlin, more probably than in those of any other city; not, perhaps, so much for their purely architectural success, but for the care and skill which able architects have shown in their planning. In housing her population, the habits of Berlin are not so progressive as those of some other great cities, — Paris or Vienna, for example. Separate dwellings are the rule, and apartment houses the exception. But on the designing of detached city houses, of semi-country houses, as it were, her modern architects have spent much talent. Of these, the finer residence streets, especially near the Thiergarten, furnish as attractive and elegant examples as are anywhere to be found.

THE SANITARY CONDITION OF CITY HOUSES.[1] — III.

THE most important improvement in house-drainage that has been made is the comparatively recent one which has grown out of our better knowledge of the true character of the decomposition taking place in the soil-pipe. It has for its objects — and it accomplishes these objects perfectly — the reduction of putrefactive fermentation to the lowest minimum, and the complete and immediate dilution of the gases which the slight remaining putrefaction produces. It consists in creating throughout the whole length of the soil-pipe a constant supply and a constant movement of fresh outer air. Except for the danger of freezing in cold climates, the best way to accomplish this purpose is to admit a small air-pipe — one inch in diameter will be sufficient — at the lower end of the soil-pipe, at or near its passage through the house-wall, and the continuing of the soil-pipe itself, full bore, up through the roof of the house, furnishing it with an efficient cowl to increase its draught.

In climates so cold that even this small direct admission of air would be dangerous, the pipe through which it comes may pass for a greater or less distance under the ground, or inside of the cellar, to raise the temperature of its air above the freezing point. With a good draught in the soil-pipe itself, enough fresh air may be admitted through even fifty feet of one-inch pipe.

Fludder's modification of the system is even more complete and effective, and its adoption will add little to the cost of the best plumbing work.

Fludder not only carries the soil-pipe through the roof, but he

[1] Continuation of a paper read before the Public Health Association of New York, by George E. Waring, jun.

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also carries another pipe of the same size from the top of the soil-pipe where it is about passing the foundation wall, along the ceiling of the cellar, and up through the kitchen-chimney flue, — the only flue in the house that is sure always to be heated. The course of the air in this case is down the main soil-pipe, and up the kitchen-chimney ventilating flue. It secures a large volume of air — there cannot be too much — and the all-important constant circulation. A valuable adjunct of this system is a damper or valve in the main soil-pipe, above the highest closet connection, which ordinarily stands open, but which being connected with the pull-up lever of each closet, is closed when this is raised. The construction of the closet is such that when it is being emptied, there is no trapping water between it and the soil-pipe. When the handle of the closet is raised, its first effect is to close the valve in the soil-pipe, and its next to open a free passage between the water-closet and this pipe. While the closet is thus open, it affords the only inlet for air to supply the draught for the ventilating flue. When the handle is released, the closet seals itself with water; the valve in the upper part of the pipe is opened, and the free circulation is re-established. Should the amount of cold air admitted by this system be enough to cause a closing of the soil-pipe with gathering frost, this very closing will prevent the further admission of air, and the warmth of the house will soon melt away the obstruction ; which, be it understood, is at a high point in the soil-pipe, where it is not likely to do harm, as it would do at its lower end.

Where a ventilating cowl is to be used to maintain a draught, it is important to consider its kind. The present movement both here and in England is in favor of some form of mechanical device by which the action of even a slight wind shall increase the suction by mechanical means, when even a slight wind is blowing. It is more important that the current through the soil-pipe should be constant, than that it should be rapid; and these mechanical cowls, of which Banner's and the Archimedian are good examples, offer a certain obstruction to the flow when at rest. In baffling winds Banner's cowl especially may easily cause a back draught.

Whatever may be best for smoke-flues, nothing has yet been devised which is so good for soil-pipes as the old "Emerson" ventilator, of which the patent has run out, and which therefore lacks the advocacy of liberal advertising. This cowl increases the draught with every wind that blows, and in every eddy; and when the atmosphere is at a dead stillness, it offers no obstruction to the circulation.

The soil-pipe being properly constructed and duly ventilated, the only further practical improvement in the waste drain system seems to lie in making its branches, which lead from bath-tubs, wash-basins, etc., as short and as large as practicable, so that they may partake by the transfusion of gases, of the purer condition of the air in the soil-pipe itself. It will not always be possible to ventilate each of these pipes independently, though this is always desirable; but with a ventilated soil-pipe and large free waste branches, we need fear no serious tainting of the air that they contain.

Did the limit of this paper suffice, it would be well to consider the construction and location of water-closets; but I must confine myself to the simple question of the proper ventilation of the apartments in which they stand. Unfortunately, it is rarely practicable, as our houses are arranged, to give them an open outer window; but they surely require some more efficient means of ventilation than a small hole in the wall more than half closed by the air-bothering network of a register, and leading into a small flue choked and obstructed from bottom to top with rough lumps of intruding mortar. The ventilation of these apartments would be materially improved by the use of shafts of six-inch earthenware pipes smoothly jointed, discharging well above the roof, and protected by an elevated cap against the entrance of rain-water.

There is a somewhat active modern crusade against the stationary wash-bowl, and as stationary wash-bowls are ordinarily arranged, the crusade is certainly justified. At the same time, the convenience of these appliances, and the degree to which they augment the luxury of an abundant water-supply and a good drainage system, are so great that it is worth an effort to retain them. Such a wash-basin anywhere within the house is, under its existing conditions, in danger of becoming a channel for the influx of sewer-gas; and even were our drainage pipes and sewers so carefully arranged as to reduce the production of foul gases to the minimum, it would still be most important to remove the possibility of the entrance of drain air anywhere within the house.

I trust that I may be excused for mentioning a device of my own for accomplishing this purpose. It consists in supplying wash-basins, bath-tubs, butler's sinks, kitchen-sinks, and all vessels, except water-closets, by which a water-supply is made useful, with a plug that closes the main outlet from below, so that any pressure of gas instead of forcing it open shall force it more tightly shut, and so arranged that it must always remain closed except when held open by the hand; and in putting a stop-cock in the overflow pipe, worked by the same handle that works the stop-cock of the supply-pipe, so that when the supply-pipe is open and the overflow may be needed, this latter shall be open also, and that when the supply-pipe is closed, the overflow pipe shall be completely closed as well. With this arrangement it is impossible that there should be the least connection between the air of the drainage system and the air of the room; the usual water-trap seal below the basin, worthless though it is as a permanent reliance, suffices for protection during the short time required to fill the vessel.

Aside from its danger the usual wash-basin is objectionable as being something less than fastidiously nice. If it has a plug and chain, these become soiled with dirty water, and are not thoroughly cleansed before the next use. If the waste plug is operated by a handle rising through the slab, there is a considerable length of pipe between it and the bottom of the basin, which is sure to be coated with a slime of soap and dirt, with which the next filling of the basin is materially fouled.

These latter defects are removed by my device and by a recent invention of Wheaton of Dayton, O. If by the use of any of these improvements the entrance of sewer-gas is prevented and the dirty outlet chain or slime-coated open outlet pipe is got rid of, I see no reason why the most liberal extension may not be given to the use of all manner of vessels to be filled from the public water-supply.

There are many minor details that might with advantage be alluded to did time permit, — such as the objections to long horizontal waste-pipes ; the importance of having these waste-pipes trapped only at their upper ends, delivering at their outlets into a freely ventilated soil-pipe ; the increasing importance of ventilating waste-pipes in proportion as their length increases ; the necessity for delivering the ventilation of foul pipes at such points as will prevent their outflow of air from being involved in the back-draught of unused chimneys ; and all the long detail of house ventilation and the pregnant subject of the poisoning of the air by the carbonic oxide produced by the burning of anthracite, which Dr. Derby demonstrates in his valuable monograph on "Anthracite and Health;" together with the effect on health of that foul-smelling effluvium which comes from the heating of organic dust by steam-pipes, and which makes an unventilated steam-heated room so disgusting to the unaccustomed nostril.

These are relegated to a secondary position because, like the necessity for free sunshine in all inhabited rooms, they are less obviously connected with the question of life and death than is the matter of drainage pure and simple, and are therefore less likely to engage immediate attention.

Interest in sanitary improvement will naturally first apply itself to the more serious causes of fatal and distressing disease; but once awakened it will pursue the whole range of the subject and will, let us hope, not abate until it has compassed a perfectly wholesome condition in every department, and has secured to all, what all have a right to demand an entirely safe human habitation.

THE ILLUSTRATIONS.

DESIGNS FOR A PUBLIC LIBRARY, BY MR. H. EDWARD FICKEN AND MR. W. KIRKUS, JUN.

THESE drawings received respectively first and second prizes in the competition opened to junior members of the Institute by the New York Chapter, and decided on Feb. 22. Subjoined is the programme of the competition, which was open to junior members of all Chapters of the Institute : —

A public library in a country town, located in an open square, 200 x 200 feet; to have space for a miscellaneous collection of 10,000 volumes. and to comprise a public reading-room, a private room for the librarian, a trustees' meeting-room, and two small private rooms for purposes of study; apartments for a janitor and his family, which may be placed in a basement; the floor of basement to be on a level with ground, and to have a cellar under it; the building to be of brick or stone, and fire-proof.

All drawings to be executed in India ink, it being optional whether they be tinted or not. Geometrical elevations will be required, and the addition of perspectives will be desirable.

The Committee on Education will decide on the merits of the designs. Diplomas of first and second rank will be awarded, and published, with the selected designs, in the *American Architect and Building News.*

DRY GOODS ESTABLISHMENT OF R. H. WHITE, BOSTON, MASS. MESSRS. PEABODY AND STEARNS, ARCHITECTS.

CELLS OF THE HOUSE OF DETENTION, ST. PETERSBURG, RUSSIA.

"ART AT HOME."[1]

THESE little volumes of from ninety to a hundred pages each are reprinted from the original English editions, and belong to the "Art at Home Series," embracing such subjects as *Drawing and Painting*, by W. H. Stacey Marks, A. R. A.; *Dress*, by Mrs. Oliphant; *Family Music*, by John Hullah; *Domestic Architecture*, by J. J. Stevenson; and including other volumes to follow on Gardening, Sculpture and Carving, Needle-work and Lace-making, etc.

[1] *A Plea for Art in the House*, with special reference to the economy of collecting works of art, and the importance of taste in education and morals; by W. J. Loftie, B. A., F. S. A., author of "In and Out of London."
Suggestions for House Decoration in painting, woodwork, and furniture, by Rhoda and Agnes Garrett.
Philadelphia: Porter and Coates, 822 Chestnut Street. Price $1.00 each.

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The works before us are of the nature of tracts. They are addressed to the "middle class" public of England, and pretend to no greater scope than the enunciation of a few leading principles; the first advising as to the most judicious method of collecting furniture, pictures, prints, books, and china, and the second proposing to show how the traditional ugliness of a London hired house of the second class may be partially redeemed.

The picture presented of the characteristic London house is gloomy and forbidding in the extreme. The walls of the hall are covered with varnished paper meant to have the appearance of marble; the woodwork is grained in imitation of oak, walnut, or marble; the floor is laid with a cold tile pavement bad in design and color; light is admitted through glass of crude and violent colors; the balustrade of the staircase is of cast iron with coarsely moulded ornament, picked out perhaps with incongruous gilding. The dining-room is hung with crimson and gold flock paper, or painted with a uniform tint of light green; the woodwork is grained, and the doors decorated with black composition finger plates and handles; the chimney-piece is of black marble with an ugly cast-iron grate; the curtains are of crimson rep; the furniture is of heavy mahogany "bent and curved into every form but that which would secure sound construction and harmonious lines." In the drawing-room there is a watered white and gold or sky-blue paper; the enrichments of the ceiling are picked out with all the colors of the rainbow; on the floor is upset "the whole contents of a conservatory;" the furniture is a mass of ingenious discomfort and "solicitous wrigglings," — "all convulsed with a desire to be sufficiently elegant for a drawing-room;" and over the whole is waged a warfare of ill-assorted colors. The bedrooms are dark and dingy; the woodwork is painted maple, a whitey-gray paper is on the walls, and the chimney-piece of muddy-looking marble holds a cast-iron grate which no fire could make cheerful; the bedstead is a mahogany "half-tester," or of cast iron painfully overlaid with vulgar ornament; the wardrobe coarse and heavy, of light wood with dark panels covered with paintings of prehistoric flowers; and the rest of the furniture either oppressively opulent with massive mahogany, or of modern genteel Gothic, a gross libel upon Eastlake; the drapery is rep, and the green Brussels carpet is bespattered with bouquets.

We may dare to assert that in all the essentials of comfort, workmanship, and fitness, our own houses of the corresponding class, bad as they are, are considerably in advance of the English type as here set forth. The Philistinism of our good cousins must be dense indeed, if the enormously active propaganda of their art schools and museums, metropolitan and provincial, if the example and teachings of their Burgesses, Streets, Morrises, Dressers and Eastlakes, for the last busy ten or fifteen years, have not yet penetrated deep enough to create some impression on the domestic life of their middle classes. Our own people, less bound by traditions perhaps, more accessible to fashion and novelty, have certainly felt somewhat of this pervading influence, and some faint reflection of sound principles in color and form has found its way into every respectable house. At all events, if we have not the substance of the new religion, we have at least its shadow — its foreshadow perhaps. Our people have certainly become familiar with the value of neutral tints, and for some reason or other prefer furniture with straight lines decorated with chamfers, notches, cusps, tiles, and billet-mouldings. The conventional white marble mantel has given place to the one in wood, and the carpets are very apt to present nature duly conventionalized. For these reasons we are especially ripe for any good tract in the interest of the new gospel of taste.

The Misses Garrett meet the emergency with tact and spirit, taking no high flights, and confining themselves to homely regions. At least so far as their own countrymen are concerned, the few simple rules which they lay down and their application of them to familiar examples can hardly fail to have good results where a more ambitious treatment of the subject would have stony ground for its seed.

The principles of taste as laid down in these books, though elementary, are in the main sound and of useful application anywhere, but in some respects they seem better suited to the atmosphere of London than to our own. Thus we find in regard to color that the books reiterate the dogma that harmony [analogy?] is more beautiful than contrast, and advocate a lowness of tone and a studied plainness of color which seem singular when we reflect on the subtle oppositions of tints and the delicate appreciation of the value of contrasts, which are exhibited in the modern fabrics and wall-papers from the English manufactories. But, considering the ancient and deep-seated heritage of ugliness against which they address themselves, these ladies have perhaps taken the safest course: it is better not to open the door of the garden too wide if the people are likely to go astray in its mazes. We are disposed to think moreover that in what seem to us their timid limitations of color-treatment, these English ladies have also had regard rather to good housekeeping than to high art; for they wage continual war against the "blacks" or "smut" of the London atmosphere, and provide against it by innumerable contrivances of washable floors and walls, and "harmonize" their colors to meet this phenomenon half way. We Americans may continue to rejoice in our contrasts of positive and neutral colors, and, under our clear skies, to profit by the purity and freshness of bright walls.

In setting forth the value of plain neutral color our authors make the surprising statement that in the best period of painted glass "nearly three-fourths of a painted window were composed of white glass"(p. 19); and Mr. Loftie remarks on his 34th page that "a perpendicular stripe tends to lower the appearance of height." The principles which these books endeavor to inculcate are in the main too good to be endangered by examples which are not in accordance with facts. We must protest too against the woodcuts in Mr. Loftie's book, which certainly do more harm than good; that on p. 38 especially we might select as an example to be avoided in every respect of subject and execution. In its peculiar province of advice on the subject of collecting, his book however is worth reading, and the subject is enlivened with a fund of interesting anecdote.

We have only space to add that none of these authors are absolute in their Gothicism or Jacobinism, and they afford us in respect to furniture a grateful rest from high dogmatism. The ladies especially are well-bred enough to recognize the merit not of comfort and soundness only, but of quaintness, in certain old furniture of the last century handed down through decent and careful households to the present generation. And here is certainly a just observation: "It is obvious that in comparing old woodwork with new, there is danger of comparing the best efforts of the old workmen with the worst or with the most ordinary work of to-day; a comparison which it need not be pointed out is unfair. Such a course is as unreasonable as it would be to compare one of the exhibitions of the old masters with the annual exhibition of the Royal Academy. In each of the first we have the choicest pictures painted by the greatest masters during a space of from ten to twenty years; in the latter we have the efforts of the rank and file for the current year only."

If we are fortunate enough to have lady readers we would commend to them, as among the most valuable passages in the Misses Garrett's book, those relating to the application of needle-work to draperies and to the lost art of marking and decorating household linen (pp. 81, 83).

CORRESPONDENCE.

THE ACCIDENT AT THE NEW YORK POST OFFICE.

NEW YORK.

THE theme of discussion among the architects here since Tuesday the 1st inst., has been the Post Office crash. The general public were horrified on the afternoon of that day to hear that four men had been crushed to death on the upper floor of the new Post Office building by the falling in of a section of the roofing. Rumor for a time exaggerated the affair into a wholesale caving-in of the whole roof; when the rush was over, it was found that a section of the deck-roof near the curb on the north-east curtain of the building had fallen in, killing outright three of the laborers working beneath it, and fatally injuring another. Several escaped most narrowly, two of the men springing through the mansard roof windows upon the broad main cornice. The gang at the time were under the orders of Mr. Thomas A. Oakshott, who now fills the post of supervising inspector in charge of the completion of the building. Mr. Oakshott is by particular occupation a stone-cutter, and had formerly very acceptably filled the post of inspector of cut-stone work; latterly, however, Mr. Oakshott has had supreme control, under the direction of Mr. J. G. Hill, the Supervising Architect.

The room in which the disaster occurred is about fifty feet long by thirty feet broad. On one side is one of the interior brick partition walls sixteen inches thick, beside which is built an eight-inch wall, leaving an air space between; on the opposite side is the framework of the mansard roof. Originally the room had been divided into two unequal portions by a brick wall extending down through the several floors. On the third and fourth floors is one of the United States court-rooms; and to gain more room, the brick transverse partition wall was here removed some time ago, but the section of the wall in the fifth floor was allowed to remain. Having nothing for its support but the ordinary floor beams, it caused a deflection in the ceiling of the court-room sufficiently marked to excite apprehension among the members of the bar and others. The central portion of the wall was knocked away, leaving an irregular arch of brickwork; but even yet the depressions continued, and it was determined to remove the brick cross wall entirely and support the deck-roof at that point by a truss thrown across the room. This would throw the entire room into one space. A truss similar to the one it was intended to erect already existed across the apartment; and in the corresponding apartment at the north-west section of the building three of the trusses sustained the roof. The trusses were of the ordinary Howe form, with four compartments, and about four feet deep between the upper and lower chords. The truss had been constructed at the works of Heberman and Haven of Trenton, and was to all appearances a duplicate of those already in position. The roof above was a heavy construction of concrete and cement, resting upon a series of corrugated iron arches held by nine-inch rolled beams ex-

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tending from truss to truss along the length of the room. When the new truss was placed in position, these smaller beams were allowed to rest upon its upper chord, apparently without bolting. The roof was of concrete, three inches thick at the crown of the arches and twelve inches at the haunches; over this was laid a two-inch thickness of cement, and above all a sheathing of copper, making a total weight of one hundred pounds to the superficial foot of roof surface. On Tuesday afternoon the work of placing the truss in position had been completed, and the group of workmen were busily engaged in knocking away the wooden struts which had supported the roof during the progress of the alteration. The last timber had been loosened, allowing the full weight of what was intended to be its permanent load to fall upon the new truss, when, without a warning deflection, the whole area of roof extending from the west wall of the apartment across the place where the new truss had but a moment before rested, up to the old truss, came down with a deafening crash, burying several of the men, and throwing down sections of plaster off the ceiling into the empty court-room below.

Mr. Oakshott has nothing to say respecting the mishap: he was of opinion that all was right, and can only attribute the break to a flaw in the iron of the truss. Mr. Hill, who was away from the city at the time, on his arrival and after an inspection of the wreck was similarly non-communicative. Already several investigations have been set on foot. The coroner's jury includes R. M. Hunt, President of the New York Chapter of Architects, R. M. Upjohn, Henry Fernbach, Leopold Eidlitz, all architects well known throughout the profession; associated with them are a number of builders and masons, and the prospect is that a thorough inquiry will be made into the antecedents and circumstances of the affair. Thus far, beyond taking a look at the broken ironwork, the jury has not taken any evidence. Secretary of the Treasury, Mr. Sherman, has ordered an investigation on behalf of his department, to discover how far, if at all, any blame may be attached to his subordinates Hill and Oakshott. Upon this commission are Mr. George B. Post and Theodore Weston, architects, William Laimbeer, builder, the superintendent of the Architectural Iron Works, and other experts. The result of the investigation of this committee will be laid before Secretary Sherman in a few days. In addition to these examinations, the United States grand jury here are preparing to act on the matter, and discover if any criminal negligence can be shown on which to base an indictment. The general impression is that there has been a careless neglect in not giving the truss a most careful scrutiny before allowing the weight of the concrete roof to fall upon it. According to one gentleman's statement who was in conversation with superintendent Oakshott after the crash, he does not appear to have been aware of the weight of the roof which he was attempting to support. So far as he knew, he had placed the truss as the others were placed, and beyond the flaw theory he can give no reason for its fall.

Ex-Supervising Architect A. B. Mullett says, "The trouble in this case was that the truss was not properly put in. It was treated as though it were a girder, when in reality it was a suspensory truss; and instead of being fastened at the upper corners, as a truss should be, it was set in the wall at the lower side of either end, and of course it turned over under the weight of the roof, and broke down."

The ultimate cause of the accident, Mr. Mullett thought, was the dismissal of Gen. Steinmetz from his post as engineer-in-chief at the building.

Meanwhile many theories are flying about; but somehow the popular notion brings the blame home to Mr. Mullett in not making the change to truss from brick wall at once upon the partial removal of the latter, instead of leaving the work to drag along to this tragic finish. On the other hand is the fact that Mr. Mullett's control of the building had ceased; to Mr. Hill must be attached all present responsibility and blame, if negligence can be shown. On the 7th inst. the coroner's inquest will open its sessions, and by next week I hope to be able to give you the "intelligent verdict" at which they may arrive.

The Jauncey Court work, on which a spirited competition has been in progress between many Institute and non-Institute architects, and which was decided by the selection of the design from Mr. Alfred H. Thorp, has again fallen through; the joint owners of this valuable piece of Wall Street property having agreed to disagree on some trivial matters, have laid aside the general designs of Mr. Thorp. That gentleman will now act as architect for the Orient Insurance Company, in covering half the plat, while the Queen Insurance Company have secured Mr. Charles W. Clinton as architect for their section of the ground. The consequence is that in place of the united, harmonious street front, about which so many pleasurable anticipations were raised in those who are familiar with Mr. Thorp's excellent Racquet Club design, we are to have two narrow buildings of various and perhaps discordant treatment.

LIMIT OF RESISTANCE FOR SAND AND CLAY SOILS. — The Washington Monument as standing at present exerts a pressure of $4\frac{8}{10}$ tons per square foot, yet in 1874 the Board of Engineers for Fortifications stated that a pressure of five tons per square foot for soils composed of clay and sand is excessive.

THE CHICAGO CUSTOM HOUSE.

NEW YORK, April 26, 1877.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Sir, — I had no intention when writing my communication published in your issue of March 24, of instituting a controversy on the subject of the Chicago Custom House. With my retirement from the position of Supervising Architect, I felt with unmixed satisfaction that all the perplexities and annoyances connected with that building were ended. Had I foreseen a prolonged correspondence in relation to this subject, I should have refrained from attempting any correction either of the facts or inferences in the letter from Chicago of March 3. I am quite unable to see the bearing of certain statements made by "Foundations" in the communication published in your number of April 14, relating to the drawings and instructions first issued by the Supervising Architect for the increase of the foundations. How instructions which never took effect could in any way modify the present condition of things, I fail to appreciate. If any inferences are to be drawn from the introduction of this irrelevant matter into the communication, I will leave them to your readers, contenting myself with thanking "Foundations" for the opportunity given me to make certain statements in this connection, which have not, I think, before been given publicity. In reading this communication I am forcibly reminded of the old saw, "When doctors disagree, who shall decide?" "Foundations" says in relation to the additions made to the foundations, as recommended by the third commission, that "in the opinion of many who are competent to judge of such matters, nothing has been done to those foundations which is of any practical utility." In answer I have simply to say that in the opinion of many who are competent to judge of such matters, *something* has been done to those foundations which is of practical utility. When the bearing-surface of the concrete footings was increased in width, little more than one-fourth of the ultimate weight of the building had been placed on these footings, and they had not therefore been brought down to the level to which it is fair to conclude such weight would finally bring them. It will not be denied that had they been increased in width before the basement was built, their capacity to carry would have been in relation to this increase. Had the entire weight been placed on the concrete before the additions to it were made, then such increase would have had little if any beneficial result in resisting settlements. The settlement of the building necessarily takes place as the weight is gradually added to it, and any increase of foundation must be made at an early stage of the work to produce any good result. If only one-fourth of the ultimate load was on the concrete at the time its width was increased, it is fair to conclude that it had by no means reached its utmost settlement. If it had not reached its utmost settlement, and the bearing-capacity was increased, it would follow that such increase would produce a beneficial and practical result.

"Foundations" gives at some length the action of the Supervising Architect, in issuing the first instructions with drawings, for the increase of these foundations, which proposed undermining the concrete under the building, and setting the new concrete below the line of the old concrete and running under it twelve inches; and he appeals to architects and engineers as to "whether this method of re-enforcing foundations could be of much practical utility." I am very well aware that this action at the time placed me in a very false position, and I shall recount the facts connected with the action, all of which is part of the unwritten history of the report of the third commission. When the investigations of this commission were completed, and its report written and signed, one of the members at the request of the Secretary of the Treasury brought the report to Washington in person, that any thing which was not clear might be explained to the Secretary and myself. When the matter of filling in these voids was discussed, I took the position that the proper way to do it was the manner which was finally adopted. The member of the commission, however, dissented from this, and stated *as the opinion of the commission* that the proper method was to set the new concrete below the old. I thought it an extremely hazardous if not impossible scheme; but as every action of mine in relation to the building had been misconstrued and set down to malice and a desire to destroy the building to build one from my own designs, I declined to act on my own judgment, and proposed to make a drawing of this method and submit it to the member for examination, and if possible to ascertain whether the drawing fully conveyed the views of the commission. Such drawing was prepared, with instructions to excavate the area not more than eight or ten feet at any time, so as to undermine the original concrete as little as possible. The drawings and the instructions were submitted to this member *in the presence of* the Secretary of the Treasury, and he pronounced that they embodied the opinion of the commission as to the best method of doing the work. While I had protested and expressed entirely different views, I prepared this drawing in accordance with information which not only I but the Secretary considered reliable; for it was for this express purpose that the member of the commission accompanied the report, — the purpose of giving information on any subject not clearly and explicitly set forth in the report. I have not forgotten that numerous petitions, not only

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from government officials, but from architects and citizens, were immediately sent to the Secretary of the Treasury asking for my removal on the ground of incapacity; but the Secretary plainly saw that I as well as himself had received misinformation on this point, and that the fault was not to be laid at my door. I need not say that no one knew so much of the facts connected with the case as Mr. Bristow, and I need not add that I was not removed. I have borne until now the censure of the Chicago architects for a course of action which up to the present time has never received, so far as I know, any explanation. I stated in my former communication that the conditions were not the same now as they were when the first commission examined the building, and prepared its report; and this statement is corroborated, I think, by "Foundations" when speaking of the measures taken to equalize the weights and lighten the walls, which measures, had they not met his approval, would not have been spoken of in a "complimentary spirit." It is a matter of little moment whether the conditions are changed by successful additions to the foundations, increasing their capacity, or in reducing the superimposed weight to a load which the foundations unchanged could safely carry. Either course would result in a change of conditions. In redesigning the building above the main cornice line, the weight of the building was greatly lessened. The interior walls and the backing of the exterior were greatly reduced in thickness, and corrugated iron arching was substituted for brick arching between the floor beams, further reducing the weight. Given a minimum of foundation, the superstructure can be so decreased in weight as to be safely carried by the foundation, or, given a maximum of weight, foundations can be so increased as to safely carry the superstructure. In this instance the superstructure has been materially lightened while the width of the foundations has been increased, and so the conditions are not the same as they originally were, and the arguments then applicable must be modified now. Foundations which were "terribly berated" by the first commission may perhaps now be approved.

I am yours very respectfully,

WM. A. POTTER.

CURIOUS EPITAPHS.

EDITOR AMERICAN ARCHITECT.

Dear Sir, — I send you two inscriptions which I transcribed some months ago into my pocket-book from two interesting tombs of the past.

Perhaps they may be of interest to some of the readers of your paper. Yours truly,

W. G. H. SMART.

On the top of the "ledger," or covering slab, of a tomb or cenotaph in the old burial-ground near Upham's Corner, Dorchester, Mass., is deeply engraved in strong Roman capital letters the following inscription; and its quaintness of expression and orthography, as well as the fact of its being probably one of the oldest inscriptions of the colonial times in the country, make it interesting. Above the inscription is a well-executed bas-relief representing a cavalry broadsword in its sheath: —

HEARE · LYES · OUR · CAPTAINE · AND · MAIOR · OF · SUFFOLK · WAS · WITHALL .
A · GODLY · MAGISTRATE · WAS · HE · AND · MAIOR · GENERALL ·
TWO · TROUPS · OF · HORS · WITH · HIME · HERE · CAME · SUCH · WORTH · HIS · LOVE · DID · CRAVE ·
TEN · COMPANYES · OF · FOOT · ALSO · MOURNING · MARCH · TO · HIS · GRAVE ·
LET · ALL · THAT · RREAD · BE · SURE · TO · KEEP · THE · FAITH · AS · HE · HATH · DONE ·
WITH · CHRIST · HE · LIVES · NOW · CROWNED · HIS · NAME · WAS · HUMPHRY · ATHERTON ·
HE · DIED · THE · 16 · OF · SEPTEMBER · 1661.

The next inscription appears over the doorway of a tomb in the crypt or basement of King's Chapel in this city. The tomb bears the name of "Joseph Burrell:" —

DEATH is the good man's FRIEND, and the day of his death is better than the day of his birth.
"WAS DEATH deny'd, e'en FOOLS would wish to die."
The hope of future life softens our cares, and heightens every bliss: —
Then rest in peace, for we shall live again.

A STORY OF A WELSH COLLIERY.

THE liveliest interest has been felt all over England and Wales in a story which illustrates with startling clearness the dangers that lurk in the bowels of the earth, and the pluck and heroism which sometimes ennoble the dull, hard life of the miner. On Wednesday evening, the 11th of April, as the men were on the point of leaving work in the Tynewydd Mine, near Pontypridd, the roar of rushing water was heard, and the galleries and tunnels suddenly began to fill. The water had broken through from an abandoned and flooded mine, and of course rose in the main shaft and the lateral workings until it found its level. Most of the men made their escape, but when the roll was called, fourteen were missing. An exploring party went down to look for them. They found all the galleries within a few hundred yards of the bottom filled to the roof, but a knocking heard behind a wall of coal indicated that some of the missing men were imprisoned alive in a gallery which sloped upward, its mouth being under water. The wall was a few yards thick. Volunteers went at it with their picks; the prisoners worked from within; in a few hours they could hear one another's voices; but the moment a hole was broken through, the confined air, kept under great pressure by the rising water, burst out with a terrific explosion, and one of the imprisoned miners was shot into the opening as if he had been blown from a gun. He was taken out dead. Four others in the chamber with him were rescued uninjured. Knockings, however, were heard further on, and it appeared that other missing men were in a similar but still worse predicament — shut into a chamber of compressed air. It is with the efforts to release this second party that the chief interest of the story begins.

The wall behind which they were confined was in a heading that was flooded, and nothing could be done with the pick until the water had been pumped out. Divers first attempted the perilous feat of reaching the opening from the main shaft through half a mile of water, and it was afterwards ascertained that one of the men within had tried to escape in the same way. This, however, was impossible. It was not until Monday, the fifth day, that the volunteers were able to begin digging. The distance to be cut was a hundred and twenty feet. The work went on day and night with an eagerness that seemed like desperation, and yet it was so slow! Cutting through the solid coal, in a gallery not more than three feet high, where the water, only kept down by constant pumping, threatened every moment to rise and ingulf them, with trouble from gas and the danger of another explosion of air always before them, the rescue parties took their lives in their hand whenever they went into the mine; and their wives followed them with sad eyes as they entered the shaft, doubting if they would come up alive. And the hope of saving their comrades, shut up so long without food, was at best but a forlorn one. To reduce the danger from the sudden liberation of the air, — danger not only of a violent explosion, but of a sudden rise of the water in the chamber as soon as the pressure should be relieved, — air-tight doors were constructed in the cutting, and an air-pump was set in operation to establish an equilibrium on both sides of the wall. On the 18th, a week after the accident, voices were heard, and the working party were cheered by a faint cry, "Keep to the right side: you are nearly through." On the 19th, the work had made such progress that an iron tube was forced eight feet through the barrier of coal, and an attempt was made, but without success, to introduce milk through it to the famishing prisoners. The miners learned then that there were five of their comrades in the chamber, all alive, but two of them nearly exhausted.

On the night of the 19th, there remained only eighteen inches to be cut away, and the excitement rose to fever heat. An enormous assemblage of people surrounded the mouth of the mine; physicians were in readiness; a temporary hospital was prepared, and a house near by was put in order for the sufferers, if haply they should be got out alive. The state of the work was discussed in Parliament, and bulletins were flashed at short intervals to the farthest ends of the kingdom. But just when it seemed that a few strokes of the pick might complete the labor, an eruption of gas took place, and the working party had to run for their lives. In time, however, the air was renewed, and the work went on. At last, on the afternoon of Friday the 20th, a hole was knocked in, and one of the cutting party entered the cavern. All was still; in their weak condition the agitation of the moment made the imprisoned men speechless. The rescuer felt about, and, not finding any one, shouted, "Don't be afraid." The answer came, "All right; we are not afraid," and then a pair of rough arms were thrown about his neck. The first to be taken out was a boy named Hughes; and it is related that when the car came to the surface and the long suspense was over, the vast crowd of spectators "did not cheer, nor use any of the ordinary means of showing enthusiasm: all seemed too serious for that."

Cases of life preserved without food for ten days, and even longer, are not rare; though the period of abstinence which these Welsh miners endured is considered the longest which man is capable of sustaining under ordinary conditions. They were able to drink the dirty water in the mine; and water, it is well known, has a great influence in retarding the effects of starvation. They obtained a little sustenance also by sucking the grease that stuck to the bottoms of their candle-boxes, but they ate nothing during the whole ten days. Still they retained so much strength, that when the iron pipe was pushed through the wall, and the water began to rise in consequence of the escape of the air, they were able promptly to plug up the aperture; and one of the men even wished to walk when he was taken out, but the doctors refused to let him. There was only one of the five, about whose recovery any doubt was expressed at the date of our last advices. There are still four men to be accounted for out of the fourteen who failed to make their escape when the waters broke through, and these are undoubtedly drowned. — *New York Tribune.*

A MONUMENT TO VIRGIL. — A monument is about to be erected at Mantua, in honor of Virgil.

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NOTES AND CLIPPINGS.

SCULPTURE FOR THE CAPITOL AT HARTFORD. — Ives, the American sculptor in Rome, has prepared designs for two marble figures, to be placed over the eastern door of the new Capitol at Hartford. They are reduced figures of his statues of Trumbull and Sherman that Connecticut has sent to Washington. Those for the Capitol will be seven feet high, and cut in marble. Much above them, around the base of the dome, there will be twelve statues, eleven feet high, and of various symbolic significance. Other figures will fill the complementary places above the main doors on other fronts of the building, corresponding with the two of Trumbull and Sherman.

THE HARTFORD CATHEDRAL. — The Roman Catholic cathedral at Hartford, the corner-stone of which was laid on the 29th ult., is to be an elaborate brown-stone edifice of the Gothic style, with two spires each 220 feet high. Over the main entrance there will be a marble statue of St. Joseph, crowning the apex of the roof. The nave will be 264 feet in length and 93 feet in width; the transept, 178 feet; the sanctuary, 39 x 88 feet. The interior walls will be of highly polished marble; the roof will be of slate, heavily ribbed inside. There will be 200 windows in the cathedral, and 7 in the sanctuary; over the main entrance there will be an immense rose window of intricate design; the interior will be unbroken by galleries, and the pews will accommodate 2,000 persons, and there will be five marble altars. The remains of the late Bishop McFarland are to be placed under the high altar. The cathedral will cost about $300,000.

INJUNCTION AGAINST BLASTING DENIED. — Susan Sturges is the owner of a house and lot on the northerly side of West Forty-second Street, between Seventh and Eighth Avenues, New York. Adjoining her property are four lots from which Thomas E. Foran and James McManus are engaged in blasting rock so as to clear the lots and make them suitable for the laying of the foundations of houses which they intend erecting. Application was made in the Superior Court, for an injunction to restrain them from continuing their blasting-operations on the ground that her house is rendered untenable and insecure, and that there is danger that it will fall. Messrs. Foran and McManus say that her house was improperly built and its walls are full of cracks, and that it is almost worthless, and was insecure before they began to blast, — all of which seems to be very insufficient reason for Judge Sanford to deny a motion for the continuance of an injunction against them.

STRIKE. — The painters of New York have notified the masters that on and after May 7 they will demand three dollars per day. A number of employers express a willingness to comply, while others refuse. The society has ordered a strike in all the shops where the demand is not complied with.

CYPRUS ANTIQUITIES. — The collection of antiquities discovered by Gen. Di Cesnola in the vaults of an old temple at Curium was opened for a private view at the Metropolitan Museum of Art, New York, May 4. The objects which form the collection comprise gold and silver jewelry, bronzes, and many articles used in religious services in the temple. All of the gold objects are in good condition. The silver articles and bronzes, however, are badly corroded.

THE WHITE HOUSE. — It is said that when after the destruction of public buildings at Washington by the British in 1814, it became necessary to repair the damage, it was found that the sandstone of the President's mansion was badly stained and discolored by smoke and fire, and it was thought best to conceal these defects by white paint; and from that time it was known by the name of the "White House."

FIRE-PROOF CURTAIN. — Mr. E. W. Glover of Malden, Mass., has invented a fire-proof curtain which successfully resisted the severe tests to which it was subjected at the time when it was publicly tested some time since. It is intended to remain flat, and to be hoisted and lowered bodily. The surface next the audience is of a chemically prepared canvas, which cannot be made to blaze, no matter how intense the heat. The other side is of wire gauze 40 mesh, and between these two parts is a dead air space of from three to four inches in depth. At the top, on the stage side, a spray of water is to be thrown upon the wire gauze, and trickling down, will entirely fill the interstices between the meshes, so as to render it absolutely air-tight, preventing any draught of air between it and the canvas, while the steam which is constantly generating in case of a hot fire will aid in checking the progress of flame, and will so exhaust the air inside the curtain as to leave nothing to sustain combustion. Tests were made by turning upon it a gas-jet which took the full supply from a 30-burner meter. This intense heat thrown against the wire gauze, both when dry and wet, failed to perceptibly warm the canvas two inches away. A piece of ordinary manilla paper was held close to the back of the wire two and a half minutes before igniting, although the only separation from the flame was the wire gauze, then perfectly dry. It took seven minutes before this 30-burner flame forced directly upon a piece of the prepared canvas could burn a hole through it, and then the canvas was only carbonized, and cracked because of its weakness and the impact of the flame. The method of treating the canvas is this: —

1. A light solution (so as to reach and cover the interior fibres) of tungstate of soda, density 50, mixed with one-third silicate of soda, is rubbed in by machinery and then dried.

2. The canvas is then treated with a saturated solution of tungstate of soda mixed with one-half silicate of soda and a saturated solution of alum.

3. A coating of silicate of soda is applied of the consistency of ordinary mucilage in density, mixed with whiting.

The inventor has no intention of applying for a patent.

MANCHESTER TOWN HALL. — It is said that the Royal Family has declined to assist at the inauguration of Mr. Waterhouse's Town Hall.

THE SHAKESPEARE MEMORIAL. — On April 23, the anniversary of the poet's birthday, the corner-stone of the Shakespeare Memorial Theatre was laid at Stratford-on-Avon.

FALL OF A FLOOR. — On April 10, a floor that was building on the premises of the Messrs. Meux, brewers, London, gave way, causing serious injury to six of the workmen. The work in course of construction was for an ice-freezing room. It appears to have been constructed with two large wrought-iron girders set about thirteen or fourteen feet apart (carrying rolled-iron joists and arches to make a solid floor), and brick enclosure-walls; altogether a very strong structure, and one designed to carry a great weight. The immediate cause of the accident seems to have been the putting too much trust in the old though apparently sound walls of the brewery; for the girders rested upon an old wall on one side, while it was supported on the other by iron stanchions. There may have been some special shock to disturb the balance of the resisting forces, but the crushing down of the old wall was the immediate result, causing the girders to slip aside and throw down the brickwork.

FRESH WATER FOR LONDON. — Londoners are much interested in the discovery that has been made on the premises of the Messrs. Meux, mentioned above, of a copious supply of pure water, which was obtained by sinking a well to the depth of 1001 feet, where the green sand was struck, and pure water was obtained. The well was sunk because of the great cost that attended the use of the Thames water. Thanks to the efforts of the Thames Conservancy, the water of the Thames is now much purer than it was, not many years since, when the waste from dye-houses and factories and the sewage from towns were allowed to discharge themselves into the river; but though it is, as things go, fair potable water and better than is to be had in half the other places in the kingdom, there is still room for improvement, and Londoners look upon the discovery as the promise of a great boon.

STEEPLE-JACKS IN FRANCE. — The weathercock on the steeple of the village church in Soudan, France, was timeworn and rusty, and those in authority decided that it should be removed. A man clambered up the steeple, but just before he could reach the weathercock, he lost his balance and slid down for seventy feet, then rebounded to the roof of the church, and was precipitated to the ground without being seriously injured. Then a man named Chevalier strove to haul himself up by means of a rope; but at last his hands slipped, and he fell backward. His foot caught in the rope; and there he remained, a hundred and twenty feet from the ground, with his head down, beating the air with his arms, struggling to recover himself, and swaying backward and forward in the high wind. Pierre Péan now stepped forth, and volunteered to mount to the rescue of Chevalier; but after doing his best for three-quarters of an hour, he had to descend. His place was taken by Moreau, who, climbing higher than Chevalier, slipped a rope round his body, and cutting that which held his foot, freed him from the fearful position in which he had remained for three hours.

TRACES OF THE ORIGINAL TUILERIES. — The workmen who were excavating the road-bed for the new carriage-way that is to pass before the garden front of the Tuileries discovered lately in the remains of kilns, traces of the tile-works established during the thirteenth century which gave to the locality the name which Catherine de Medici adopted as the title of the palace which Philibert de l'Orme began to build.

THE PALACES OF THE KHEDIVE. — Travellers who visit Cairo can hardly wonder at the depreciation in the value of Egyptian bonds when they behold the extravagance with which the viceroy squanders his money. It has become a standing joke to reply to one who asks what may be a certain building, that it is one of the "palaces of the Khedive." Three years ago, it was said that his Highness had thirty-three palaces, and still he goes on building new ones.

STRENGTH OF BRICKS. — The Royal Society of Engineers at Berlin has been experimenting during the past five years, on the strength of building-materials. The results of experiments upon bricks are stated in the following summary: —

1. *Common Bricks.* — Number of sorts, 55; number of tests, 843. Pressure at which the first crack was noticed, — limits, 597 and 2,672 pounds; or an average pressure of 1,420 pounds. Crushing pressure, — limits, 697 and 3,200 pounds; or an average of 1,765 pounds.

2. *Hard-burned Bricks.* — Number of sorts, 35; number of tests, 650. Pressure at which first crack was noticed, — limits, 1,114 and 3,257 pounds; or an average of 2,175 pounds. Crushing pressure, — limits, 1,536 and 4,395 pounds; or an average of 2,760 pounds.

In the experiments an entire brick was placed in the machine, and the pressure per square inch when the brick first cracked was noted, as also the pressure which finally crushed it. The Department of Public Works of Berlin allows a pressure of 200 pounds per square inch, where the best of bricks and cement are used.

THE TRANSPARENCY OF METALS. — By electrical means thin films of gold and other metals can be obtained which readily transmit light. The mode of operating to produce these attenuated sheets of metal is simply to cause electric sparks to pass from wires of the required metals into tubes of rarefied air, or other gases, when the particles of metal detached from the wires by the sparks become deposited on the sides of the glass, and form an excessively thin film, quite continuous under the microscope. Gold films thus prepared transmit a fine green light; silver gives a fine blue color; copper a dull green; platinum a bluish gray; zinc and cadmium a deep bluish gray; and iron a nearly neutral tint, but slightly brownish. Before this discovery gold was thought to be the only metal capable of transmitting light even in a very slight degree.

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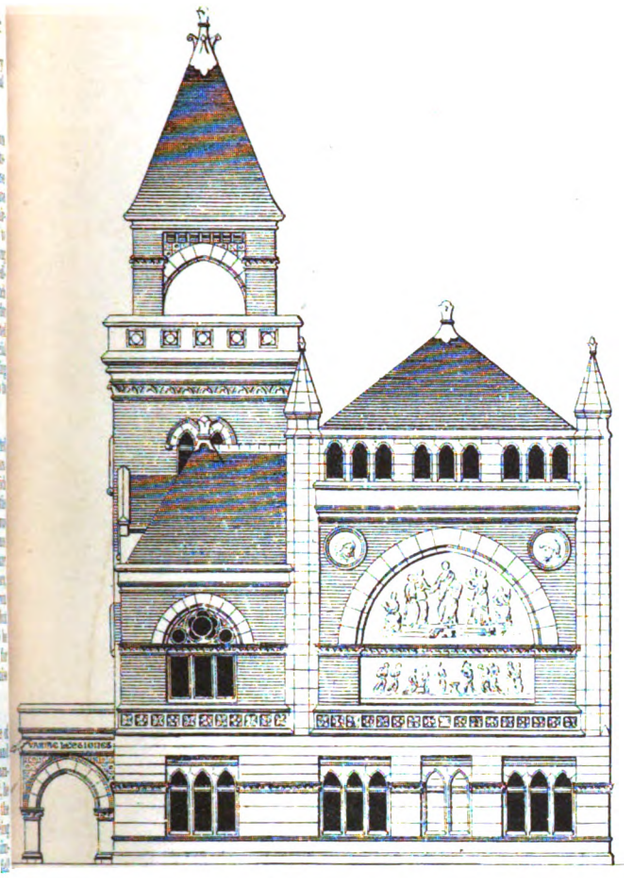
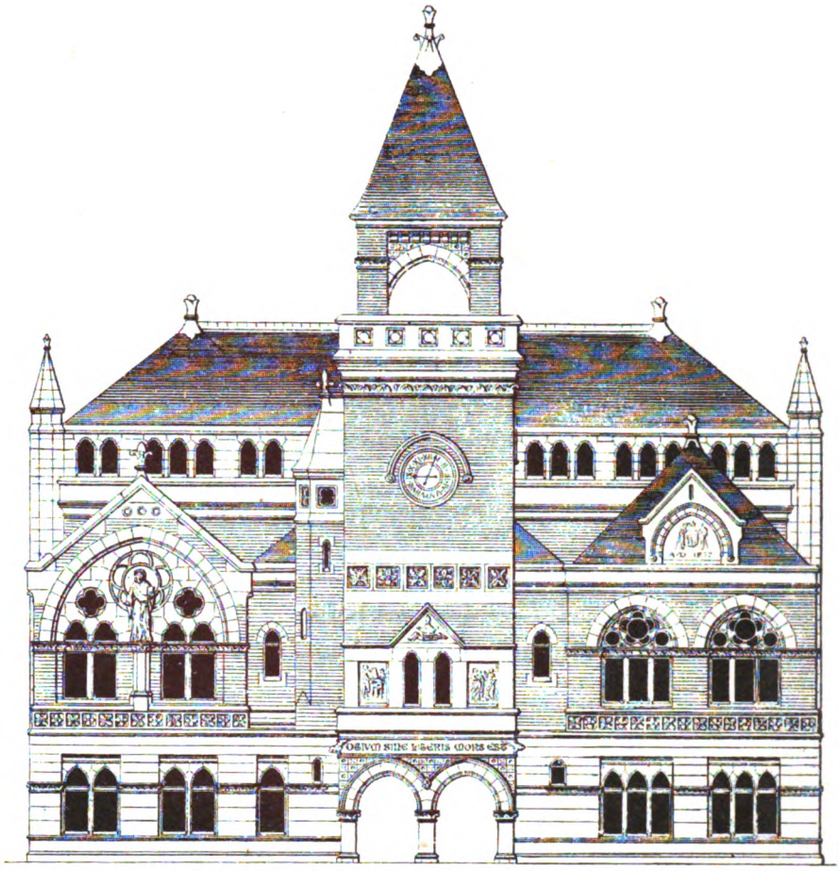
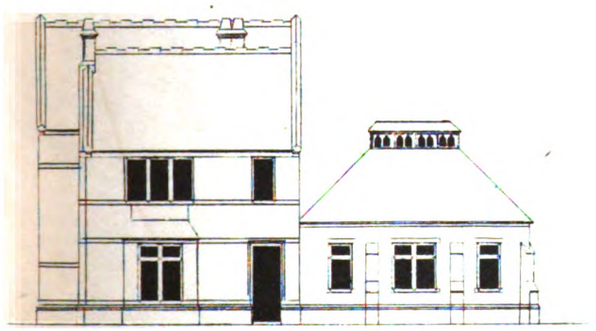


Side Elevation.



Front Elevation.

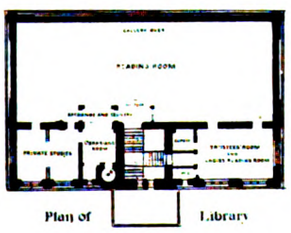


SIDE ELEVATION.

DESIGN FOR PUBLIC LIBRARY.

FRONT ELEVATION.

DESIGN FOR PUBLIC LIBRARY.



Plan of Library

Plan of Basement.

DESIGN FOR PUBLIC LIBRARY.

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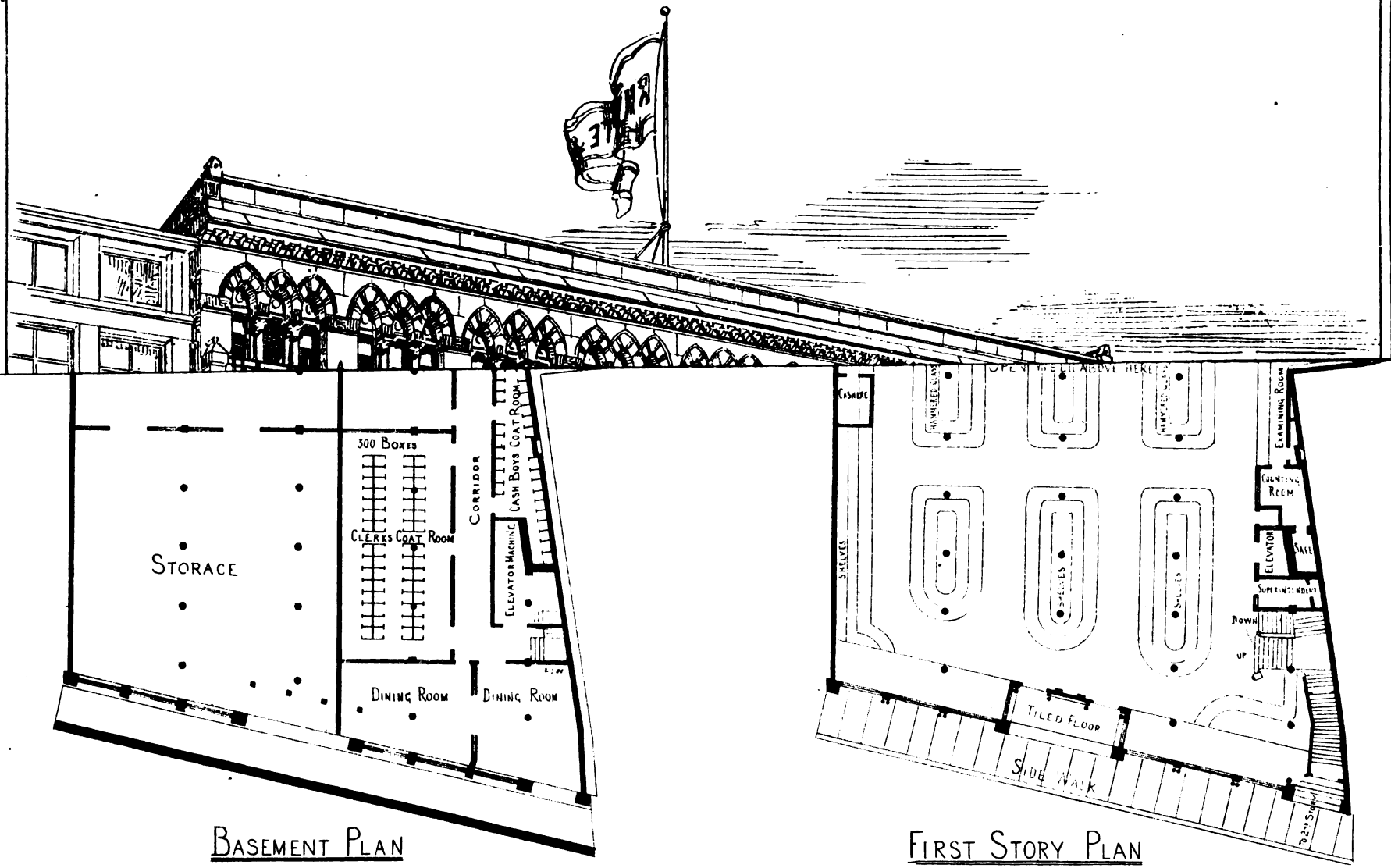

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ДОМЪ ПРЕДВАРИТЕЛЬНАГО ЗАКЛЮЧЕНІЯ ВЪ С ПЕТЕРБУРГѢ

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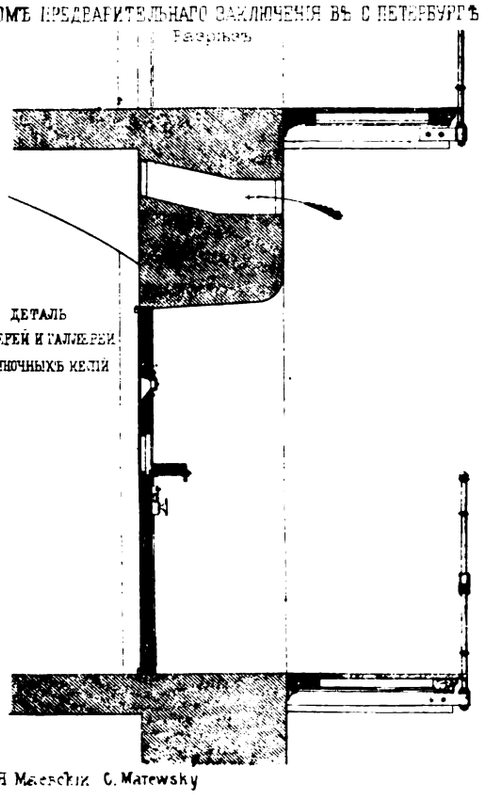
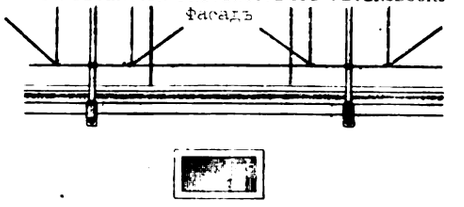


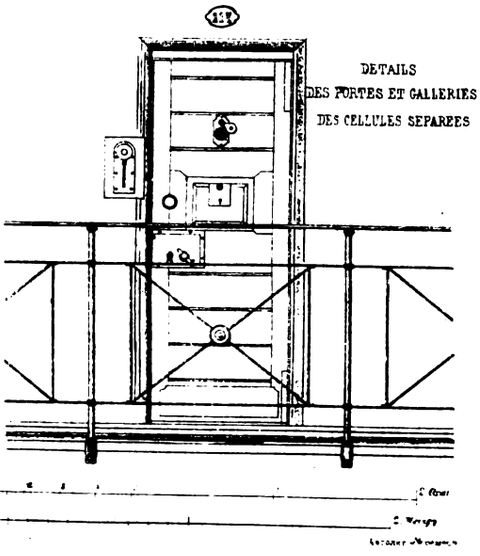
ДЕТАЛЬ
ДВЕРЕЙ И ГАЛЕРЕИ
ОДИНОЧНЫХЪ КЕЛІЙ

К Я Маевскій C. Matewsky

MAISON DE DETENTION PREVENTIVE A S^T PETERSBOURG

Фасадъ





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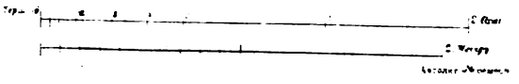

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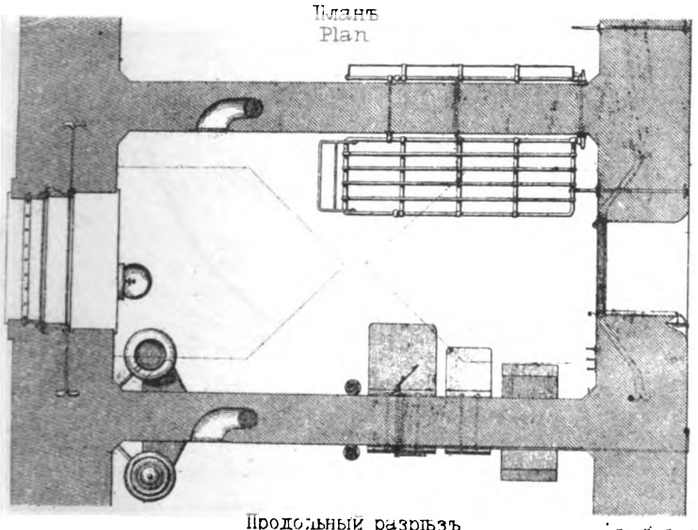
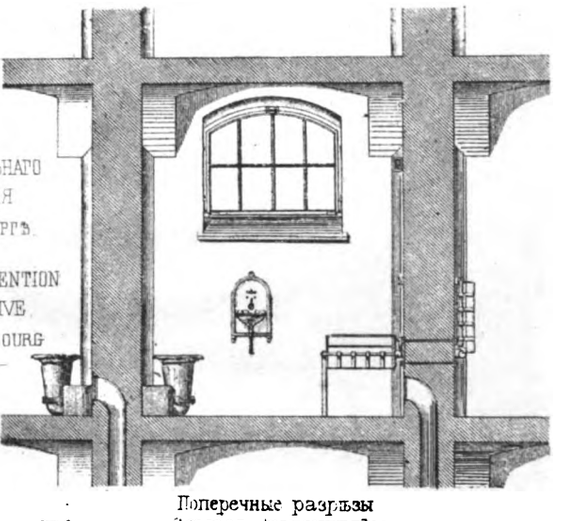


ДОМЪ
ПРЕДВАРИТЕЛЬНАГО
ЗАКЛЮЧЕНІЯ
ВЪ С ПЕТЕРБУРГѢ.

MAISON DE DETENTION
PREVENTIVE
A S^T PETERSBOURG



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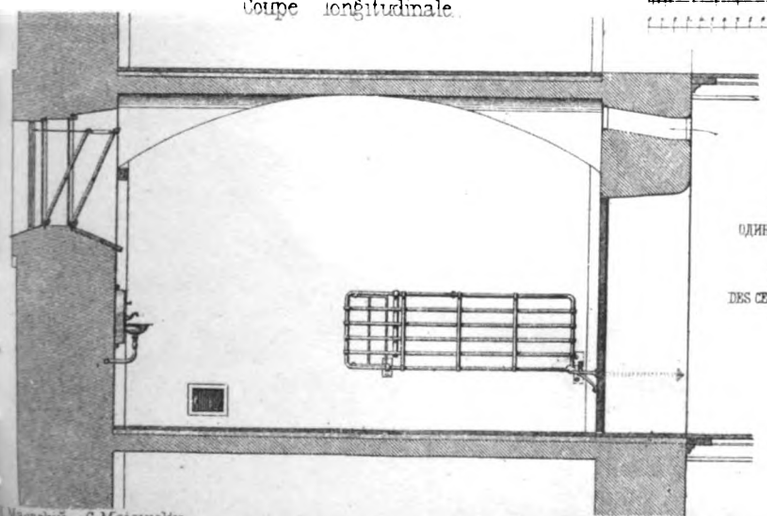

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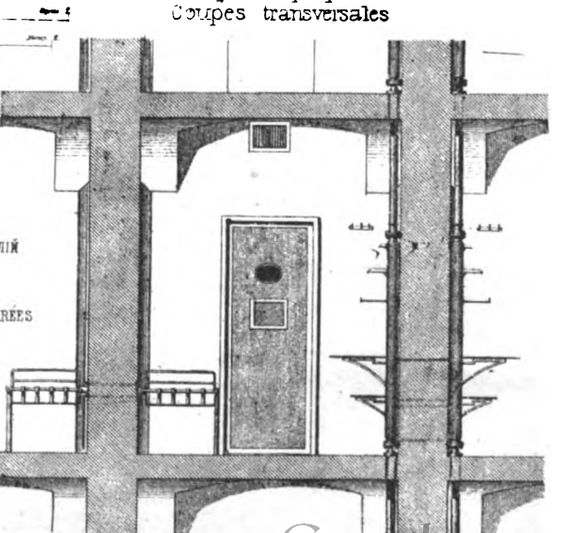

ДЕТАЛЬ
ОДИНОЧНЫХЪ КЕЛІЙ

DETAILS
DES CELLULES SÉPARÉES

К Я Маевскій C Majewsky

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, MAY 19, 1877.

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THE fall of the Rockford Court House is a yet more serious warning than the casualty at New York, of the dangers of irresponsible management. The building was an elaborate one of cut stone, and its principal feature was to be a square French dome rising above the roof and set on an attic of stone. This dome and its attic rested in front on the outer wall of the building, but the space beneath it was part of a large court-room; and in order to have it unobstructed the return walls and rear wall which should have carried the dome were omitted in the second and third stories, and two iron columns about thirty feet high were set under the corners. They carried girders, bearing the brick walls in the story above on which the dome rested. The iron columns stood upon brick wall or piers, also thirty feet high, in the first story. It was these piers apparently that gave way suddenly when the whole attic of the dome, almost ready for the superstructure, with the brick walls, girders, and columns under it, fell into the cellar with about two dozen men who were at work on it, and of whom one-half were killed. At our time of writing the immediate cause of the fall is not known; but the construction was evidently of a very venturesome kind, such as should only have been carried out with extreme care and under watchful and skilful superintendence. It resulted too, it may be said, from a violation in the design of the received canons of good architecture by introducing a useless feature in a position where it was quite out of relation with the disposition of the plan of the building. The superintendence of the building was not given to the architect, Mr. Gay of Chicago, who had only visited it at intervals as he had been called for in consultation. The building-committee had appointed one of themselves as superintendent, — a very objectionable proceeding, apart from the question of his capability, of which at present we know nothing.

THE people of Illinois have suffered much at the hands of many architects. It is hard to say whether the quarrels over the Chicago Court House have been more lamentable or more ludicrous; the outcome of them has at least been unlucky enough. The State has spent twice as much as it expected to on its new State House, and finds that a considerable sum is still needed to finish it. Even before the deplorable casualty at Rockford, the patience of the Legislature seems to have been exhausted. The feeling of the neighboring community of Indiana is shown pretty well by the character of the bill which provided for building their new State House at Indianapolis, and which we have already noticed. The Illinois Legislature has bent itself to its work in the passage of three bills, two of which have at our present writing passed the Senate, and one the House, — for the protection of travellers from hotel fire, for the punishment of the architects and builders of faulty buildings, and of building-commissioners who exceed their estimates. The first obliges the proprietors of all hotels to put in every room above the second story a wire rope ladder which will reach the ground, with a proper fastening. The second punishes with fine or imprisonment, or both, any architect or builder through whose negligence in designing or constructing a building loss of life or of property shall occur. The third deals similarly with any building-commissioner or other official in charge of state building operations, who shall order or allow any changes in the design of the buildings under his charge whereby their authorized cost shall be exceeded.

OF the first of these measures we have already told our opinion in speaking of the similar law in Wisconsin; that it was a sorry and rather absurd substitute for requirement of reasonable planning and substantial construction. We do not believe that it will ever be enforced for any length of time, or be found to be of practical value. As for the bill for the punishment of negligent architects and builders (we trust it includes incompetent ones as well), we have always argued in favor of holding such persons to a strict accountability, and of applying criminal penalties where there is loss of life; but to confound sacrifice of life and sacrifice of property as similar offences, subject to similar penalties, seems to us extremely inconsiderate. Setting aside the entire incommensurability of the two injuries, it is to be remembered that the security of life is the special charge of the state in a way that the safety of investments is not. The man who employs an architect intrusts him with what may be called a business investment. He selects his architect himself, and if there is any risk he voluntarily incurs it for his own advantage, though he may not know its extent. The proper remedy here, as in case of any unskilful management of property by an agent, would seem clearly to be found in a suit for damages, or in a forfeiture of commission. The thing to aim at is to make the proprietor whole, and this is not to be accomplished by fine and imprisonment of the offender. But a man cannot be assumed to voluntarily risk his life for his own profit; and since when he is killed he cannot be made whole, it becomes the duty of the state to protect his life by affixing criminal penalties to the sacrifice of it. In the case of a falling building the risks are further discriminated by the fact that the persons endangered are commonly not the proprietors, but persons who have not selected the architect or builder, and for whose benefit he is not employed. Moreover, in fairness, such penalties belong equally to anybody to whom similar injuries are owing, and such a measure is not complete unless proprietors of buildings, through whose interference or negligence loss of life or bodily injury is incurred, as not unfrequently happens, are put in the same category as offending architects or mechanics.

OF the bill which punishes officials who exceed their building-appropriations, it may be said that it is hardly adequate for the difficulty, and that it may sometimes even prove mischievous. So long as building-committees are what they frequently are, they will be likely to select unsuitable or inadequate designs and unsatisfactory architects. And as long as legislatures fix the limits of cost of buildings in their appropriations by their own judgment, they will be in danger of making inadequate allowances. Building-committees are apt to learn their business as they go; to cut them off from opportunity to improve the buildings in their charge by changes which involve any increase of cost whatever, by a bill which makes a small transgression of the limit as much a misdemeanor as a great one, may be to tie their hands from doing the state good service. On the other hand, to leave commissioners unlimited discretion is to invite the evils which Illinois is now deploring. The difficulty is a perplexing one; but it is not going to the root of it to put the appropriations under lock and key. A better point to aim at would be to secure the selection of the right kind of architects and designs. The guiding principle is the same that would naturally be followed in looking out for the best professional assistance in any other important matter, — either to appeal to none but those who were beyond question pre-eminent in their vocation, or else to be guided by competent professional counsel in making a selection. The deliberate general verdict of a community as to who are its best men in a profession is entitled to some confidence; but the opinion of a random individual on a question of the qualifications of an architect or the

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merits of his plan may not be worth a rush, and the judgment of most committees is of questionable value. If important state works were never intrusted to any but the most eminent architects, or if one of these were secured as counsellor and his advice allowed its due influence, whenever any general competition was permitted, our public work would probably be much better done than it is, and the provisions of the law in question might be effective if they were found necessary.

SINCE the failure of Maretzek's scheme for a grand opera-house in New York, a new project for utilizing the Hippodrome lot has been devised. The projectors of the great Music Hall for Mr. Theodore Thomas's orchestra have just issued a prospectus which announces that they have secured a long lease of the land from Mr. Vanderbilt, and invites subscriptions to the stock of the Thomas Garden Company (Limited) for the purpose of building a great winter-garden combined with what is intended to be, according to a familiar America formula, the finest music hall in the world. The lot occupies the whole block between Twenty-sixth and Twenty-seventh Streets and Fourth and Madison Avenues, and is in shape rather more than a double square, its longer axis east and west, from avenue to avenue. A late number of the New York *Tribune* gives a description of the building which it is proposed to put upon the lot, illustrated by a plan and section from the designs of Mr. Alfred H. Thorp, architect, which are contrived with much cleverness. The lower story of the building, which will be twenty-five feet high, is to be occupied by shops. It is divided by two galleries or covered streets, twenty feet wide, crossing it from north to south and from east to west, and meeting in a circle at the centre, from which diverge also similar galleries to the four corners. The eight right triangles between these passages are to be divided into the shops, of which there will be a hundred and thirty, and which will, it is expected, be occupied for light retail business, such as is found in the well-known passages of Paris, and in the famous gallery of Victor Emanuel at Milan. The passages between the shops are made to correspond with the principal aisles and walks of the garden and music hall above, which gives an opportunity for lighting them with illuminating tile.

IN the centre of each long side (on the north and south) a great staircase leads to the second floor. In the middle of this is a circular stage for the musicians, with an organ. The two halves of the building are separated by a glass screen which abuts against the stage on either hand. In the eastern half is the great music hall, with a parterre and three tiers of galleries, quadrangular in plan, but with the rear end curved into a segment to follow the outermost of the concentric ranges of seats. Around the hall is a wide corridor or promenade, outside of which are grouped the various rooms of a great restaurant which occupies the whole periphery of the eastern half of the building. The whole western half is taken up by a garden covered by an enormous square dome, and with the outer walls so contrived that they can in the summer be thrown open to the air, and in the winter closed. Stairs at either end lead to a third-floor gallery or promenade, which connects with an exterior balcony running all round the building. The whole is to be built of iron and glass, and its estimated cost is half a million of dollars, of which it is said that a quarter has been pledged in advance. This seems rather a small estimate considering the great size of the building, — some two hundred feet by four hundred and more, — and the necessary difficulties of roofing so large a space and of providing a secure floor for a second-story garden with shops beneath.

IT would seem that we are only beginning to know what relics a departed civilization has left in our Rocky Mountain regions. We find in the Philadelphia *Bulletin* an account of certain discoveries in the Animas Valley in Colorado by members of the United States Geological Survey, which are of remarkable interest. Most visitors to the Centennial Exhibition probably noticed the photographs and models of the cliff dwellings in Colorado and Arizona, of which accounts were published last year by the Department of the Interior. Prof. Hayden's reports from the Animas Valley tell of far larger and more important buildings than were found among the cliff villages. The valley appears to have been densely inhabited, and is full of ruins of buildings of all sorts and sizes, in which are found a great variety of interesting things, pottery, hides, drawings, and undecipherable inscriptions. The buildings are built of stone of various kinds laid in clay, and some of them are enormous. We refrain from giving the dimensions, which are evidently recorded by an inexpert reporter. The two largest buildings that were examined were strikingly well preserved. Like all the Colorado dwellings, they had no outside doors on the ground level, but there are ranges of port-holes, as it were, a foot square. The scale of parts is so small as irresistibly to suggest that they were the work of a small race of men, the rooms into which they are subdivided being mostly from eight by ten to twelve by fourteen feet, and the doorways being only two by four feet. The doorheads are bridged by cedar poles, on which the masonry is laid. The buildings still stand four stories high, the roofs being burned away, but some of the floors left standing. The floors rest on timbers of about eight inches [square?] set some three feet apart. Upon these are laid a layer of cedar poles, on these a layer of thin slips of the same wood, then a layer of cedar bark, and on this a layer of earth three inches deep; on this again another layer of bark and then of earth, upon which were remains of a sort of carpet of coarse grass. In the rooms that have not been exposed to the weather, a coating of whitewash still remains, and on it are drawings of men and various animals, as well as inscriptions. There are indications that there was once a balcony along one front of each of these two great buildings. The Indians of the country have a tradition that their forefathers came to their present abodes "five old men's ages" ago, and found these dwellings then in their present condition. The climate of Colorado is exceptionally dry and antiseptic, but it is difficult to believe that such floors as are here described could last five hundred years even there.

THE NEW YORK POST OFFICE DISASTER.

IT seems pretty clear that however blame may be distributed for the disaster at the New York Post Office, there was sufficient cause for the fall of the truss in the way in which it was hung. It was not a Howe truss, as was said in the newspapers at the time of the accident, but a suspension truss of the simplest type, with both top and bottom chords of full length, vertical struts, and single oblique suspension-bars, in four panels, as appears by the letter of a correspondent in another column. The outer end rested upon the upper plate of the mansard, and the inner upon the main partition wall. In such a truss all the strains are finally carried to the ends of the top chord, and the support must be applied there; the object of extending the bottom chord across the extreme panel being only to give opportunity for steadying the truss at the bottom, to keep it in a vertical plane. If the support is applied at the bottom of the truss, it must be transmitted directly to the top by stout struts, which serve not as integral parts of the truss, but merely as shores to prop the upper chord; and which need to be laterally braced at top and bottom to prevent their being overturned. In the original trusses of the building the upper chord was bolted to the upper plate of the mansard with angle irons at the outer end. The end strut or shore here was carried down to the floor, resting on a bearer, and framed into a triangular brace with an eight-inch channel-bar serving for the contiguous rafter of the mansard, the end of the lower chord being bolted to it, so that the weight on the truss was divided between the strut and the rafter. The strut at the inner end was built solidly its whole height into the main partition wall which carried the floors and roof; and the roof-beams which rested on the top chord were framed and bolted to it. According to the testimony of Mr. Hill, and of Mr. Schumann, the engineer in charge of iron construction in his office, it was discovered after the fall of the new truss that the outer end of it had never been bolted to the roof-plate, that the roof-beams were not bolted to the truss, and that the eight-inch bar and the triangular bracing at that end had been omitted; so that the whole truss was poised upon the top of the end strut, which was nineteen feet long and without any lateral stiffening or

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support whatever. As soon as the weight was let upon it the strut bowed, and the whole came down. Neither Mr. Schumann nor Mr. Hill had examined the truss, Mr. Schumann being attached to the office at Washington, while Mr. Hill, on his way to Albany, had looked at it hastily after it was in place, trusting that his superintendent, Mr. Oakshott, had assured himself that every thing was right. Mr. Oakshott appears not to have understood the construction or placing of the truss, but confided in the contractor who made it, and in his own foreman, who however knew no more than he himself. In whom the contractor put his confidence, does not appear.

The alterations thus made without proper authority show a deplorable incapacity in whoever had actual charge of the work. To exactly apportion the blame among the different persons who are concerned, is a difficult and thankless task which may be left to those whose duty it is. The technical responsibility is what concerns the public, and that ought to rest with the official who has the ultimate control of the work, that is, the supervising architect, unless he has by his system of administration deputed it to some one on whom it can be distinctly fixed. The case seems to have been just such a one as is liable to occur any day in any kind of business, in which the thing to be done is not difficult, and the method of procedure seems so much a matter of course, that supervising vigilance is thrown off its guard, and everybody takes it for granted that everybody else will do the right thing. Such cases are exactly those which require an effort to control. Those which involve difficulty or uncertainty enough to cause anxiety are pretty sure to be well looked after; but those which disarm watchfulness demand just the resolute oversight that makes the difference between thoroughly excellent and tolerably good administration. But nothing less than a thoroughly excellent administration should be required in an office which controls work of so much importance in respect of cost, public usefulness, and even personal safety, as does that of the supervising architect.

The truss which failed, though not a difficult one to construct, had an important and critical work to do. The drawings from which the others had been made were, as we understand it, on file in the Supervising Architect's office; but the contractor was left to construct it from his own notes and measurements of the others taken on the ground. The contractor's agreement was made without a written contract, and apparently without detailed instructions of any kind. We have not found any thing to show that there was a clear understanding as to whether the contractor or the superintendent should provide for the proper fastening of the truss when it had been put in place. It appears that for some reason of convenience, the truss was made shallower and therefore weaker than its fellows, and that the dimensions of some of the bars were changed, although it is not shown that this led to actual breaking of the truss itself.

There is considerable variation in the findings of the different juries which have investigated the disaster. The coroner's verdict seems to us to bear with unreasonable severity upon the former Supervising Architect, Mr. Mullett, under whom the Post Office was built. To turn away from the direct and conspicuous causes of the disaster in order to visit the chief condemnation on lesser preliminary faults takes away from the verdict the judicial character on which its value should rest. It says: —

"The immediate cause of the falling of said portion of the roof was improper and insufficient construction; but the primary cause of the disaster is attributable to the incompetency of the agents of the Treasury Department, charged with the erection and completion of the building. . . . An excessive quantity of concrete was used in the covering of the roof, and the load thereby imposed upon the iron roof exceeded the weight for which the iron constructed was originally designed, by more than three hundred per cent. All of this is owing to the incompetency on the part of A. B. Mullett, the Supervising Architect in charge at the time the roof was designed, and his local employees."

There is no mention of any person to whom the blame of the disaster belongs, excepting Mr. Mullett; yet the facts are, that so long as the building remained as Mr. Mullett designed it, no harm came to it. The verdict adds that, —

"It appears that on the removal of the wall on the fourth story the remainder of the wall on the sixth story was left standing by order of A. B. Mullett, supported, according to his direction, by two light fifteen-inch iron beams, competent to carry only one-quarter of the weight imposed upon them; that this wall was recently taken out to be replaced by an iron truss . . . but no special drawing was made for the new truss and its outer support. . . . It appears that neither the local superintendent nor said iron firm had the necessary technical information to correctly understand the functions of the truss, or how such truss should be constructed, and that in consequence its support gave way as soon as the temporary props supporting the roof-beams were removed."

Mr. Mullett has testified that when he resigned his office at the time the original alteration was undertaken and the beams put in, he recommended that the upper portion of the altered wall should be removed with the rest, and a truss substituted; and that nearly two years later, when under a new appointment he inspected the building, he renewed his recommendation, which was then adopted. The report of the special commission affirms that the suggestion of the truss was made by Mr. Oakshott and adopted by Mr. Mullett. We do not know the evidence that led the commissioners to this conclusion. The experts in the coroner's jury are men whose knowledge and professional ability entitle them to deference; yet we are puzzled to find them reporting that the iron roof carried a load three hundred per cent greater than it was designed for. Our correspondent computes the weight at eighty pounds per square foot; and we have not anywhere seen it assumed at more than a hundred pounds. It is hardly conceivable that any tolerably capable constructor should design an iron roof for a load of only twenty or twenty-five pounds per foot; and the analysis of the original truss in our columns allows for a breaking weight of about a hundred and ninety pounds.

There are some points in the construction of the original trusses which are worth noting; although they have no direct bearing on the accident, they illustrate in some degree the findings of the juries upon it. The first thing that strikes us in examining the diagrams furnished by our correspondent, which we suppose to be authentic, is the singular variation in the proportioning of the different members to their work. The ultimate strength of the top chord is nearly seven times and that of the bottom chord nearly twelve times as great as the actual stress to which it was exposed, while for the suspension bars of the end panels the ultimate strength was only about two and one-third times the actual stress. Convenience in mechanical working often requires an excess of material in some parts of a structure; but in any part a factor of safety of only two and one-third would be considered by prudent engineers unreasonably small. The excess of strength in the upper chord was given no doubt to add to the rigidity of that member because the roof-beams bore upon it at unsupported points instead of resting above the struts of the truss. One is tempted to wonder why the truss was not divided into five panels, so as to bring the struts under the beams, and by giving less obliquity to the suspension bars lessen the strain upon them.

The commission appointed by the postmaster of New York have reported to the Secretary of the Treasury that the ceiling of the court-room and the floor under the fallen truss is not strong enough, and is in danger of giving way. It is not to be forgotten that this ceiling bore the fall of the roof upon it in safety, and that it was strong enough to support the shoring on which the roof rested during the placing of the unlucky truss, although it was of course not designed for such a function. Still the replacing of the supporting partition by the two fifteen-inch beams was an evident error. They have deflected five inches or more under the weight of the floor and the shock of the fall. It was stated, however, in the evidence before the coroner's jury that they were put in by Mr. Steinmetz, Mr. Mullett's superintendent, on his own judgment. Nevertheless the framing of such a floor and ceiling untrussed, with a bearing thirty-six feet, is a thing that requires great caution, and Mr. Mullett is probably officially responsible for the way in which this is done, as he is for the narrow margin of safety with which the original trusses were designed, and for the strength of the $10\frac{1}{2}''$ beams in the roof, whose bearing was very long, and which it is said showed deflection, though there is no indication that this had any ill result.

On the whole, the presentment of the Grand Jury, which we give in another column, seems to us to cover the merits of the case more fairly than any other that we have seen. Its most significant points are these: —

"The accident may be said to have resulted from the adoption of defective work without previous inspection or approval by any quali-

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fied persons. Neither Dougherty nor Oakshott was a proficient architect or engineer and neither of them could claim or did claim when before us to be capable judges of the sufficiency of the truss. It seems to us that if the Supervising Architect cannot personally superintend all the structures under his charge, the position occupied by the supervising inspector should be filled by a person of professional attainments superior to those of its present incumbent.

"The Supervising Architect in this case seems to have put a confidence in the supervising inspector, to which from his skill and judgment he was not entitled, and the supervising inspector in turn to have been similarly over-confident in his foreman. It may at least be suggested that Government has either shown an excess of confidence in the person selected to the position of Supervising Architect, or has imposed upon him an excess of duty. We are willing to believe the latter to be the case."

It is pretty clear that there was an excess of confidence among the persons in charge of the alterations, and that Mr. Hill's examination of the truss before the shores were taken away was not what it should have been unless he had absolute and well-founded trust in the capability and vigilance of his inspector. It is pretty clear that the inspector was not qualified to judge of such a construction as he was superintending. No careful architect will defend the ordering of so important a piece of construction without furnishing full drawings and careful directions. But an instance of negligence is not a proof of incompetence, and no one who is familiar with the organization of the office of the Supervising Architect can doubt that more is laid on him than one man can properly accomplish.

THE ILLUSTRATIONS.

HOUSE AT LONG BRANCH, N.J. MESSRS. POTTER AND ROBERTSON, ARCHITECTS.

(52 William Street, New York.)

THIS house is building for Bryce Gray, Esq., at Long Branch, N.J. It is comparatively inexpensive, depending for its effect upon the disposition of its parts, and not on the use of surface ornament. It is finished in the interior with light woods, and the furniture, designed by the architects, will be in harmony with the general finish of the various rooms.

HOUSE FOR DR. BUMSTEAD, NEW YORK. MESSRS. WARE AND VAN BRUNT, ARCHITECTS.

(2 Pemberton Square, Boston, Mass.)

HOUSE AT PRIDE'S CROSSING, BEVERLY FARMS, MASS. MESSRS. CABOT AND CHANDLER, ARCHITECTS.

(60 Devonshire Street, Boston, Mass.)

THE OLD AND NEW TRUSSES OF THE NEW YORK POST OFFICE.

See article, "The Fall of the Roof of the New York Post Office."

CORRESPONDENCE.

THE POST-OFFICE DISASTER.

NEW YORK.

THE triple investigation into the matter of the broken Post Office truss is over. The coroner's jury in the regular course of procedure was duly called to determine the cause of death; the board of examination convened at the instance of the Secretary of the Treasury, in whose department the duty of public building construction lies, have reported; and the Grand Jury of the United States Circuit Court, criminal branch, have sent in their presentment on the subject. Those best able to form an opinion preferred to defer the utterance of their views until the facts touching the construction of the truss and its surroundings were laid before them. In the evidence offered, this has been pretty thoroughly done, and leaves little doubt that there had been from the very highest official in the Federal architectural bureau, down through his subordinates, a shifting of the responsibility, until the real inspection of the work, such as it was, came to be left in the hands of ordinary foremen fit only to oversee the hauling and pulling of common laborers. It was a clear case of general supervision carried to its natural sequence where clearly defined responsibility is not exacted.

The first witness called on the coroner's proceeding was Thomas H. Oakshott, the representative of Mr. Hill in the care of the general government buildings in this city. Mr. Oakshott is by trade a stone-cutter, and he has never gained that thorough knowledge of building which would fit him for the post assigned him. His operations in the case of the truss were limited to ordering Heuvelmann, Haven, & Co. to supply a truss similar to others in the building, and directing his foreman Dougherty to shore up the roof, and remove the brick wall whose work it was intended to impose upon the truss. Once or twice Mr. Oakshott passed under the truss, glanced up at it. Had he examined it ever so closely, there is no evidence that he would have detected wherein Messrs. Heuvelmann, Haven, & Co. had slighted their work, but even this minimum of duty was not performed. As a matter of fact, it is not at all certain that the iron firm intended to supply the several attachments found with the old truss. In the old, an eight-inch rolled-iron rafter rises at the outer end of the truss, and is bolted into the upright leg on which the truss stands. The memoranda of pieces proposed by Mr. Haven did not include this important strengthening adjunct, yet its absence was either ignorantly or carelessly overlooked. Supervising architect Hill testified to what little he remembered of the truss before the accident, and ever so much examination since the smash. Mr. Schumann, the civil engineer attached to the office, charged with the mathematical computations necessary, was the only witness appearing to possess a training which made his opinion worth the asking. In the case of this truss, however, he had not been consulted, and was only useful in pointing out the defects of the affair erected. Mr. Mullett was called, but he professed to have forgotten every thing he had ordered during his official term, retaining merely the general impression that whatever he had then ordered was right. The evidence of the contractor and workmen only went to prove that in this instance at least supervision by any one capable of exercising it was entirely absent. The presentation of the evidence which had occupied the sittings of three days was followed by a three hours' discussion by the jury, when the verdict was given.

"The coroner's jury duly sworn to inquire into the cause of the death of Dennis Fleming, Charles H. Robertson, and Patrick Johnson, find that they came to their death by the falling of a portion of the roof of the New York Post Office, on the first day of May, 1877.

"We further find the immediate cause of the falling of said portion of the roof to be from improper and insufficient construction; but that the primary cause of the disaster is attributable to the incompetency of the agents of the Treasury Department, charged with the erection and completion of this building, and that the United States Government is responsible for this calamity.

"We further find that an excessive quantity of concrete was used in the covering of the roof, and that the load thereby imposed upon the iron roof-beams and their support exceeds the weight for which the iron construction was originally designed by more than three hundred per cent; that all of this is owing to incompetency on the part of A. B. Mullett, Supervising Architect in charge at the time the roof was designed, and his local employees; and that the civil engineer, the only party appearing before us competent to design and compute methods of construction, has, according to the testimony, no authority in carrying out the construction (his functions are entirely advisory), and that the Supervising Architect and his employees, not themselves technically intelligent, omitted to recur to his advice when changes were made by their authority. It appears that on the removal of a wall on the fourth story, the remainder of the wall on the fifth story was left standing by order of A. B. Mullett, supported according to his direction by two light fifteen-inch iron beams competent to carry only one-fourth of the weight imposed upon them; that this wall was recently taken out to be replaced by an iron truss, and that the cost of the truss was reported to the Superintending Architect at Washington, D.C., by the local superintendent here, and the expenditure approved by him, but no special drawing was made for the new truss and its outer support; that the understanding between the local superintendent and the iron-workers was for a truss similar to another truss then in the building

"It appears that neither the local superintendent nor said iron firm had the necessary technical information to correctly understand the functions of the truss needed, or how such a truss should be constructed, and that in consequence its supports gave way as soon as the temporary props supporting the roof-beams were removed.

"Furthermore, we are of the opinion that the method now in vogue in the Treasury Department in Washington of designing and constructing government structures throughout the United States demands intelligence in local superintendents, in this or similar emergencies, which the Government has certainly not in this case been successful in securing.

'JOHN H. JACOBUS, *Foreman*, R. M. HUNT,
JOHN P. MAGOVERN, HERMAN HERMAN,
RICHARD M. UPJOHN, G. H. TAYLOR,
LEOPOLD EIDLITZ, WILLIAM H. BRYANT,
HENRY FERNBACH, VINCENT P. TRAVERS."

The United States Grand Jury's consideration of the case is included in a presentment to Judge Benedict, whose court-room lies immediately below that in which the break occurred. The presentment gives a very concise history of the case as follows: —

"Some months ago it was believed that the safety of this court-room demanded the removal of a brick wall which crossed the floor in the story immediately over it, and upon which the roof in part rested. A substitute for the wall was required to sustain the weight of the roof, and as such substitute a truss or combined girder was determined upon. Early in April a proposal to furnish the truss was received by Thomas H. Oakshott, supervising inspector of construction, from Messrs. Heuvelmann, Haven, & Co., and by him accepted, his action being subsequently approved by James G. Hill, Supervising Architect. The terms of the agreement were meagre, vague, and indefinite. The truss was to be a duplicate of one already in place, and which was considered adequate. The truss indicated as a model was maintained in position at its northern extremity both by a perpendicular support and by a connection through rivets and ties with one of the obliquely inclined rafters of the mansard, and was also bolted to the transverse beams of the roof. The truss furnished by the contractors was supported neither by a rafter nor by rivets to the beams above it. The professional testimony concurs that the fall of the roof was occasioned by these deficiencies.

"One thing is certain, — that the defects were obvious and apparent if the attention of a competent and experienced person had been drawn to them. As a matter of fact, the direction to remove the props that had sustained the roof while the truss was being adjusted was given

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by Edward H. Dougherty, the foreman of mechanics, and no prior inspection or acceptance was had.

"Immediately upon moving the props, the failure of the truss was demonstrated. On the Saturday prior to the Tuesday on which the disaster occurred, the completion of the work was reported by the foreman Dougherty to the supervising inspector. With an injunction to avoid any sudden shock or jar to the truss in removing the props, the matter was left in the foreman's hands. A prudent suggestion was made to the supervising inspector from Mr. Haven, of the firm of contractors, that the roof-beams, owing to their deflection and the length of span they traversed, demanded the support of still another truss, to be placed midway between that furnished by them and the western wall of the building. This suggestion was apparently disregarded. On Monday the Supervising Architect and the supervising inspector passed through the fifth story of the building, and the attention of the former was casually called to the new truss. He expressed no criticism upon it, and subjected it to no examination. In brief, the accident may be said to have resulted from the adoption of defective work, without previous inspection or approval by any qualified person.

"Neither Dougherty nor Oakshott was a professional architect or engineer; and neither of them could claim or did claim when before us to be capable judges of the sufficiency of the truss. It seems to us that if the Supervising Architect cannot personally superintend all the structures under his charge, then the position occupied by the supervising inspector should be filled by a person of professional attainments superior to those of its present incumbent. The Supervising Architect in this case seems to have put a confidence in the supervising inspector to which, from his skill and judgment, he was not entitled; and the supervising inspector, in turn, to have been similarly over-confident in his foreman. It may at least be suggested that the government has either shown an excess of confidence in the persons selected for the position of supervising architect, or has imposed upon him an excess of duties. We are willing to believe the latter to be the case. It is proper to state that the supervising inspector was found by the present Supervising Architect, when he succeeded to the position, in the exercise of the duties of the place, and was retained by him. It is a painful task, in view of the calamitous result of the imperfect work, to reflect upon individuals. It is a responsibility, however, that we are not at liberty to avoid. Our limited time has not enabled us to make an exhaustive examination of the degree of risk — if any exists — of the recurrence of such an event as that of the 1st of May.

"We are unable to pronounce emphatically upon the propriety of such a departure from the original design of the structure, as that which was made by the former Supervising Architect, in removing the partition-walls which originally divided what is now this court-room, without at once removing the corresponding wall above it, and adopting some substitute to receive the superimposed weight. In our opinion, although not the immediate cause of the disaster, it was a grave error. Neither are we able with confidence to express an opinion upon the question whether the roof is unnecessarily over-weighted with concrete, or the beams and girders subjected to a strain beyond their capacity. We are induced by the moral evidence before us urgently to recommend that these and similar questions involving the security of the building should be properly determined by thorough examination, to be made by a commission of technical experts. Its result, if it should be merely to allay apprehension, would be valuable, while if it should suggest the necessity of modifications to insure safety, the most speedy and efficient action in this direction should be undertaken. By a unanimous vote of the grand jury, this presentment is directed to be signed in their behalf by their foreman and secretary, and the same is done accordingly. JOHN H. UHL, *Foreman.*"

The opinion of the Treasury Commission is of more value, as coming from a company of experts whose attention was confined to the causes of the accident, and the conditions under which it took place. The *personnel* of the commission were: architect, George B. Post; ironworker, A. J. Campbell; builder, Samuel Lawden; superintendent of buildings, W. W. Adams; architect, D. Jardine; carpenter, W. H. Gedney; mason and builder, William Laimbeer, *chairman;* engineer and architect, Theodore Weston, *secretary.*

The workmen and architects were examined, excepting A. B. Mullett, who sent when summoned a long letter endeavoring to show "that the present unfortunate disaster was in no form or manner due to any fault or imperfections, either in the original designs, the working-drawings, or the practical execution of the same." As the commission needed facts and not opinions, the letter was not received. The report of the commission opens with a letter from Mr. Mullett of July 11, 1874, directing the changes for the creation of the new court-room.

"In order to carry out the instructions of Mr. Mullett, a tier of beams constituting the then fourth floor was removed from the space now occupied by the United States Criminal Court Room in order to give it increased height of ceiling, and a brick partition wall then dividing the room transversely was removed to increase its length. This brick wall which had also extended through the attic story of the building, and carried a portion of the roof, was under these instructions required to be supported above the ceiling of the court-room by a wrought-iron girder, introduced at the time the wall was removed. The insufficiency of this girder proved to be the primary cause which finally led to the sad catastrophe of May 1. . . . No copy of the plan referred to in Mr. Mullett's letter can be found in the office of the New York Superintendent, nor does any record there appear of a written description or specification for this girder; consequently it is not possible for your commission to determine whether the design for the girder was made or approved by the officials of the Washington office of the Supervising Architect. The engineer of that office, Mr. Schumann, asserts that he never knew the dimensions of this girder nor the method of its construction. . . . At a subsequent period, the precise date of which no testimony absolutely establishes, the girder was discovered to show signs of weakness, as an opening about fourteen feet wide and ten feet high was taken out of the attic wall to relieve it. When the court-room ceiling was furred and plastered (apparently in the winter of 1874 and 1875) the girder was hidden from view. Subsequently the ceiling cracked, and fractures were noticed in the brickwork at the jambs of the opening of the attic wall above; and it appears that Mr. Oakshott, the present supervising inspector in charge, directed the attention of Mr. Schumann as well as of Mr. Mullett to the condition of both ceiling and wall, and suggested that the whole wall should be removed and that its place as a support for the roof deck should be supplied by a truss, and that Mr. Mullett agreed to recommend the substitution to Mr. Hill, the present Supervising Architect.

"The following extract of a letter from Mr. Mullett to Mr. Hill is in compliance with that promise: —

NEW YORK, Dec. 2, 1876.

JAMES G. HILL, *Esq., Supervising Architect.*

Sir, — In making alterations in the original designs to provide for the Criminal Court Room, a brick partition was left in the fifth story, supported by a beam that was not suitable and should have been condemned. It subsequently settled and caused a crack to appear in the ceiling of the court-room. Efforts were made to remedy this by the late assistant superintendent, by having a large opening in the wall. This is not, however, an effectual remedy; and I earnestly recommend the removal of the wall and the insertion of a roof-truss as in the other cases. Very respectfully, A. B. MULLETT,

Supervising Architect New York Post Office.

"On April 2, 1877, Mr. Oakshott addressed the subjoined letter to Mr. Hill: —

APRIL 2, 1877.

JAMES G. HILL, *Esq., Supervising Architect, Washington, D.C.*

Sir, — You will no doubt remember that during one of your recent visits to this building, I called your attention to the settlement of a brick wall dividing the large room in the fifth story (now used as a dormitory), and directly over the Criminal Court Room. I have carefully noted the settlement, and find that the cracks in the court-room ceiling, caused by the same, are increasing, and it is necessary to remove the wall at once, substituting as a support for the roof an iron truss of the same design as those now in position in the adjoining rooms. These trusses were supplied by the Kellogg Bridge Company, at a contract price of $438.67 each. Enclosed please find proposal of Messrs. Heuvelmann, Haven, & Co., for supplying the additional truss for the sum of $233, which it will be seen is $205.67 less than the contract price of the Kellogg Bridge Company. In view of the emergency of the case, I have accepted the proposal of Messrs. Heuvelmann, Haven, & Co.; and as the work is properly preservation and repair of a public building, I would respectfully request that the expenditure be authorized from that appropriation. Very respectfully, T. H. OAKSHOTT,

Supervising Inspector in Charge.

"Mr. Hill approved the action of Mr. Oakshott."

The report gives the letter of Mr. Hill and the memorandum of the firm offering to supply the truss, and then briefly describes the setting up of the truss, the removal of the supports, and the fall of the roof. It then says: —

"A comparison of the fallen truss with the one adjacent and now standing, which was to be copied in the construction of the new one, reveals the fact of several important differences. (A plan of the model truss, made from actual measurement, taken by this commission, is appended to the report, also a plan of the new truss, similarly measured as it now lies). The rafter with its ties and braces to the vertical strut is wholly omitted, and this strut, being neither bolted to its shoe nor built into the wall, stood free without lateral support. The roof beams instead of abutting into and consequently bracing the upper chord in the new truss, as they did in the original and adjoining one, simply rested upon it and were not secured to it in any way. The new truss was also of about nine inches less depth, and consequently its proportion of superfluous strength (the factor of safety) was correspondingly reduced without lateral support.

"An examination of facts and measurements and computations made by the commission prove, first, that the girder introduced under the wall when the alteration was made in the United States Court Room was so insufficient for the purpose that it must have long ago failed, had it not been for the fortunate fact that the brick wall which it supported was a particularly sound and strong one, and that it proved to be not only practically self-sustaining, but also (on the principle that it contained a natural arch), to have been able to hold the weight of the roof besides; and that the said girder is so insufficient in proportion that when now relieved, as it was by the wall, from all the weight of the roof, and all the weight of that portion of the wall itself above its natural lines of fracture, which runs at an angle from the extreme ends of the girder, nothing but the fact that it happened to be constructed of exceptionally good iron, and that the floor above it has never been loaded by an ordinarily great weight, has prevented the Criminal Court Room beneath from having been the possible scene of a far more serious accident than that which has now occurred in the room above it. The girder has now a deflection of five and a half inches, with a length of thirty-five feet two and a half inches between its bearings. The extent of the cracks in the ceiling of the Criminal Court Room did not necessarily indicate the exact curvature of and consequent danger from the girder; for the ceiling has some self-sustaining power independent of the floor on which it is hung, as is proved by the fact that many of its suspending rods are loose. (The floor has sagged in places more than the ceiling.) As the strength of the girder is impaired, although the main load it was intended to carry is removed, and as under no condition is it strong enough to support with a sufficient margin of safety that portion of the floor alone which it is still called upon to carry, your commission recommend that it be either materially strengthened, or that its place be supported by a new and properly proportioned girder.

"The wisdom of the order to remove the wall and supply its place with a truss is manifest. The roof trusses adjacent to the truss that failed, which carry substantially the same load, are proved to be sufficient to support the roof with safety. The letters of April 2 and 3 from Mr. Oakshott, superintendent, to Mr. Hill, Supervising Architect, and of Mr. Hill to Mr. Oakshott, prove that a contract was authorized for a truss which would have been adequate to safely support the roof.

"The fact that important elements of stability and strength in the model truss are not found in the new truss explains its failure. The omission of a rafter with its bracing, which was a main reliance for the safe support of the end of the horizontal portion of the truss above it, was the primary cause of the accident. Its omission left the whole weight of one-half of 573½ square feet of roof, with its iron beams, corrugated iron arches, and unnecessarily heavy concrete, also of the metal roofing and accidental load, to be borne by a single strut 19½ feet long, formed of the 6-inch channel bars. Placed back to back, 3½ inches apart in the first 14 feet, 8 inches of which form the base, there are but two separations, through each of which passes a three-quarter inch bolt. The strut stood absolutely free and without lateral bracings. It was manifestly utterly incapable of sustaining the load placed upon

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it, and, as might have been expected, crippled, bent sideways, at a point three feet below its union with the truss. As no provision was made to brace the top chord of the truss laterally, either by bolting the deck beams of the roof to it directly or with angle irons, or by notching them on to it, it was deficient in lateral stiffness and in danger of failure, of crippling the upper chord.

"Finally, the present accident is due to two causes:—

"*First:* That the truss erected did not correspond with that recommended by Superintendent Oakshott, approved by Supervising Architect Hill, and *apparently* contracted for by Messrs. Heuvelmann, Haven, & Co.

"*Second:* That the shores were removed, and the truss was subjected to its load, before it was examined by a person competent to determine if it was constructed in conformity with the contract.

"Your Commission considers that it is perhaps a fortunate circumstance that this accident, sad as it is, has led to the detection of the radical weakness of the hidden girder of the ceiling of the United States Court Room, the continuance of which is now a source of jeopardy, and the community have great reason to be thankful that they have been spared the details of a calamity far more appalling in its character."

FALL OF THE WINNEBAGO COUNTY COURT HOUSE AT ROCKFORD, ILL.

CHICAGO, May 12.

YESTERDAY at half-past eleven in the morning, the greater part of the interior walls and roof of the Winnebago County Court House in course of erection suddenly fell without warning, burying in the ruins nearly all the workmen employed on the building. The daily papers report that eleven were killed and ten mangled, some of whom may die. The contractor and superintendent had a narrow escape. They were left on the walls, and had to be rescued by ladders.

The architect of the building is Henry L. Gay of Chicago; the contractor for the whole W. D. Richardson of Springfield, who also had the contract for the State Capitol, and for the prison labor of the convict stonecutters at Joliet. The superintendent was F. E. Latham of Rockford, who was also a County Commissioner of Winnebago County, and a member of the building-committee.

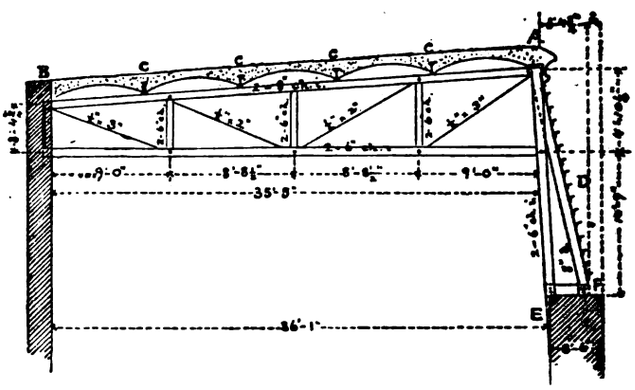
The County Commissioners advertised for plans in competition in the spring of 1875, and Mr. Gay was selected as architect over thirteen competitors. The contractor Richardson was awarded the work, and commenced the building early in 1876. Mr. Gay did not superintend the building, but made stated visits whenever called on for consultation. The superintendent was appointed by the building-committee.

Mr. Gay had not visited the building for three months, and at the time of the disaster was at Geneva Lake. The only information to be had is such as can be gleaned from the despatches which are from unprofessional sources, and do not contain sufficient technical information to form the basis of a deliberate judgment as to the actual cause of the downfall. From such sources as are at present accessible I have ascertained that the building is a rectangle faced on all sides with Athens limestone, having a high basement above ground, and two stories. The exterior is quite elaborate, having long pilasters on the piers running through two stories with a heavy stone cornice. The main entrance is a very high arch rising above the roof line, and supported on each side with clusters of long columns. The doorway is deeply recessed, and above the arch the work is carried up square all around and surmounted by a stone cornice. There was much heavy and elaborate carved stonework at this point, and above it rose or was intended to rise a square dome, which was only for exterior effect. About one-half of the stone wall supporting the dome was carried on brick walls in the attic story supported on iron girders and two cast-iron columns which stood in a large court-room. The columns were under the angles of the dome, and about thirty feet long. They stood on brick and stone piers running down to the foundations from the level of the second story floor. The accounts seem to indicate that these piers gave way first. The interior construction was intended to be fire-proof throughout. The contract for the whole work is nearly $200,000. At the time of the catastrophe, the last course of stone had just been set on the square brick tower supporting the dome. It is presumed that nearly the whole interior is a perfect wreck, and possibly the exterior walls may be seriously injured. I will endeavor to give you next week a more detailed account from personal observation. Thus far it is impossible to say whether the accident is attributable to defective planning or bad workmanship or both, or to estimate the extent of the damage. It is the most serious disaster of the kind that has ever occurred in the State, and has caused an intense excitement in its immediate locality.

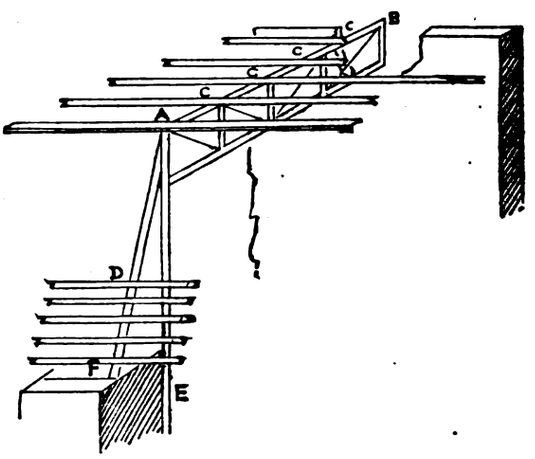
THE ROOF TRUSSES OF THE NEW YORK POST-OFFICE.

A CORRESPONDENT in Washington has sent us a description of the trusses of the New York Post Office, to which the one that gave way on the 7th inst. was supposed to be similar; and from it we extract the following analysis, illustrated by the diagrams which accompanied the letter:—

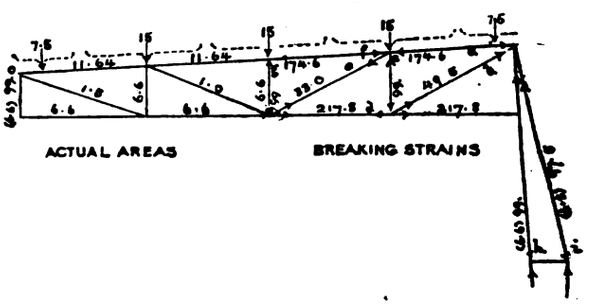
The ultimate strength of the bar "b," which is in tension, is $33 \times 1.5 = 49.5$ tons. Using this strain in constructing a stress diagram, not shown here, we find the corresponding stress upon the adjacent strut to be 22.5 tons; and to this strut will be transmitted half the load upon the truss, provided it is uniformly distributed; therefore the load which if uniformly distributed would break the bar "b," and consequently the truss, would be $2 \times 22.5 = 45$ tons. Such a load would be represented by a weight of



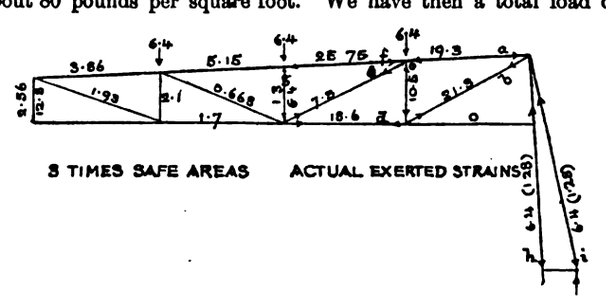
sixty tons: this divided among the four panels of the truss, would give fifteen tons to each panel; and since half the weight in the extreme panels is transmitted directly to the supports, $3 \times 15 = 45$ tons



of the weight remain as the load on the truss. Hence we may assume that a weight of sixty tons of roof would be enough to break the truss. The truss carries about 640 square feet of roof, of which



therefore the breaking weight would be $\frac{120000}{640} = 187.5$ pounds per square foot. What the truss has really to carry is a weight of about 80 pounds per square foot. We have then a total load of



$640 \times 80 = 51{,}200$ pounds (25.6 tons) equally distributed, or about 42 per cent of the actual breaking strain of the truss.

The annexed diagrams exhibit clearly, one the actual areas and the breaking strains of each member of the truss, the other three times the safe areas and the strain to which each member of the truss was actually subjected.

STREET-CLEANING IN PARIS. — It is said that it costs a million dollars a year to keep the streets of Paris clean.

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THE FALL OF THE ROOF OF THE NEW YORK POST-OFFICE.

NEW YORK, May 14, 1877.

THE report of the secretary's commission and the verdict of the coroner's jury are so at variance with each other, that it seemed to me your readers would be glad of a plain statement of facts on which they could form their own judgment.

The existing state of the case previous to any of the work resulting in the accident was this: A room in the fifth story, with mansard roof of iron purlins and slate, and deck roof of I-beams, corrugated iron arches, concrete, cement, and copper covering (see fig. 1). The I-beams rested on the outer walls A B and I K, and on the partition wall C D, and were framed into the top chord of the truss E H. It will be seen from the diagram that the truss E H and the partition wall C D had practically each the same amount of roof to carry; the partition wall C D rested on two 15-inch I-beams bolted together to make a girder (fig. 2, T). This girder also carried the floor-beams (W, fig. 2) of about 455 superficial feet of floor, and was not sufficient for the purpose. It appears in evidence that the partition wall C D originally rested upon a wall extending from the foundation, that this wall in the fourth story was removed to enlarge a court-room, and that the girder (T fig. 2) was inserted to supply its place by Mr. Steinmetz on general authority, and without consultation with the engineer of the department. Cracks appeared in the ceiling below, and it was supposed that the weight of the wall upon the girder was causing it to deflect; but subsequent investigation seems to show that the weight of the floor instead of the wall caused the deflection. It was however decided to remove the wall C D; and a contract was made with a New York firm to make and put in place a truss exactly like truss E H (figs. 1 and 3), which was in plain sight. This truss E H was in general terms made as follows; top chord, two 8-inch channel-beams, back to back, about one inch apart; bottom chord, two 6-inch channels; tension-bars, 3 x ½ inches; outer support, a figure 4 of 8-inch I-beam, and double 6-inch channels. This truss has been shown by proper calculation to be ample in strength for all it was called on to do, and also by the fact that it stood the severe wrenching of the fall of the other part of the roof; and had the contract been carried out, and the new truss been the same as the old one, there could have been no trouble. But there were three vital defects in the making and putting up of the new truss, either of which would probably account for its failure.

1st, It was deemed inexpedient to disturb the roof by attempting to frame the roof beams into the upper chord of the new truss, as they are in the old truss E H. The truss was therefore made nine inches shallower than the model or old truss, and the roof beams were allowed to rest *on* the chord, but were not in any manner fastened *to* it. This makes the first mistake.

2d, The makers paid no attention to the *sectional* area of the iron used, but appear to have thought that nominal sizes expressed strength: so they substituted for the original 8-inch channel-bar, ½-inch web, sectional area about 6½ inches, a 9-inch channel-bar, ¼-inch web, sectional area only about 5¼ inches. They did this evidently intending to compensate for the *decreased* depth of truss by an increased depth of top chord, — good intention, but poor practice. This was the second mistake.

3d, The old truss was mainly supported at one end by (see fig. 3) an 8-inch I-beam, which, following the incline of the roof, rested on the front wall, and was secured to the channel-bar supports M by two 6-inch channel-bars N, making a figure 4. The 8-inch beam L was also greatly braced by the 2-inch angle purlins ten inches apart, which connected it with other rafters.

In the new truss (see fig. 4) this support was entirely omitted, and the truss rested wholly upon two light 6-inch channel-bars some 18 or 19 feet long. As soon as the shores were removed the inevitable consequence followed; that is, the channel-bars R buckled under the weight, and bent to nearly a right angle at S, and the whole roof expected to be supported by that truss fell.

There is an important error of statement in the papers in regard to the weight of roof, which I am able to correct, having had the opportunity to make accurate examinations upon the ground. The beams used were 9-inch heavy beams, 30 pounds per foot; there were three inches of concrete at the crown of the arch, but not therefore, as your last week's correspondent states, twelve inches at the haunches (from which you would infer there was an average of 7½ inches). The actual springing of the arch is about two inches above the bottom of the beams. Then the arch takes out from the average the segments of a circle made between the crown and the springing of the arch on each side, so that by actual measurement the average of concrete was 4¼ inches. The weight of the roof then was as follows per superficial foot:—

I-beams	4 lbs.
Corrugated arch	3 "
Concrete, 4¼" @ 125 lb. per cub. ft. . .	45 "
Portland cement, 2" @ 80 lb. per cub. ft. .	14 "
Copper	1½ "
	77½ lbs.

The roof was calculated with a factor of safety of 3 for 60 pounds per superficial foot, and of course was perfectly safe at the above weight.

The weight was about 35 pounds per foot *less* than it would have been had a brick arch been used. There were two remarkable facts shown in this matter, one of which you mention in your last week's article, — viz., the strength of the floor upon which the roof falls. Fifty tons fell upon the floor, a distance of some 18 feet. The shock must have been tremendous, and the beams are of course badly bent, having a permanent deflection of 5½ inches; but they did not go down, showing there was abundant ultimate strength in them.

The other fact was the strength of the ceiling under this same floor, and which was hung to it.

The plaster-work upon it was of the most elaborate nature. Notwithstanding the great deflection above mentioned, and the enormous shock, not a piece of plaster on this lath fell. The clinch seems to be a very perfect one.

The following facts thus seem to be developed:—

1st, A supporting wall was taken out; and to furnish supports for what this wall had carried, a girder of two 15-inch beams was put in its place: this was in the fall of 1874.

2d, This girder was insufficient for its work, which was mainly the support of a large area of floor.

3d, The remedy was not to take down the partition wall, which added but a small percentage to the total weight, but to strongly truss the weak girder.

In regard to the immediate accident, the following was shown:—

1st, A truss was contracted for a few weeks since, to be made and put up precisely like another truss already in place and doing the same work and in plain sight.

2d, The contractors omitted two vital points and changed one essential point.

3d, The shores appear to have been removed before there was any official inspection, and acceptance of the work.

UNTRUSTWORTHY ESTIMATES.

TO EDITOR OF AMERICAN ARCHITECT AND BUILDING NEWS.

In your issue of April 21, there is something said concerning the "unreliable estimates" given by architects. Now I propose to show why these estimates (which are correct at the time they are made) so often prove unreliable and generally too low.

In the first place, a person goes to an architect and says, "I want a building" thus and so (giving about the amount of room required); "I don't want any gimcracks or unnecessary ornament about it: now what do you think it will cost?" Of course the architect is prompted to give a guess; and that rude guess the person carries out and quotes as if it were a careful estimate from the architect.

It must be remembered that nine-tenths of our patrons talk so as to make their desires appear small, while the architect is making his preliminary drawings; but as the drawings progress, a great many little things are introduced at the suggestion of the owner which he did not contemplate having at first.

Finally the drawings and specifications are completed, and they include not only the amount of work orignally estimated, but all these little things which the owner thought he did not want at first, but which he has insisted upon having put in, one after another, as the drawings progressed. Perhaps he has enlarged the house two or three feet on one side for the benefit of one particular room, and one foot more on the end to enlarge some other room: this enlargement makes the house cover nearly twenty per cent more surface of ground; but to the owner's mind, only two or three feet on a side and one foot on the end will not make *much* difference.

But all these little alterations and additions add very materially to the cost, and the architect is blamed for "unreliable estimates" because the house covering 2,500 feet of surface cannot be built for the same price that the house first talked of covering 2,000 feet of surface would cost.

Perhaps the owner thinks that stucco cornices would look well in the chambers, and since mantles are pretty cheap, he concludes to put them in all the chambers. He did not want any of these things at first. Now who is to blame if the cost figures up larger than was at first calculated?

The owner well remembers the sum the architect guessed the building would cost, but he forgets that he did not want all these things at the time of that estimate.

These are some of the ten thousand reasons why people find architects' estimates unreliable.

Yours respectfully, A PRACTITIONER.

ARCHITECTURE AT CORNELL UNIVERSITY. — President White has recently purchased for the Architectural Department of Cornell University over three hundred large photographs of French architecture, and nearly one thousand photographs of different periods of Italian architecture. He has also purchased a large number of chromatic and other reproductions of the interior and mural decorations of Pompeii and of many edifices from cities of more modern date. The University Library will be further enriched by the best French and German works on Pompeii.

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NOTES AND CLIPPINGS.

FALL OF A BRICK BUILDING. — A large six-story brick building in Alleghany, occupied as a manufactory by the Excelsior Coffin Works of Hamilton, Lemmon, Arnold, & Co., fell with a terrific crash about noon, May 10. Fortunately there were but few persons in the building, and these, with one exception, escaped death, although some were severely bruised and cut. Mr. Eugene McGeary, a contractor engaged in making some repairs on the building, was buried in the ruins, and up to midnight his body was not recovered. The precarious condition of the walls and portions of the building yet standing renders search impossible until they are braced to prevent further accident.

FALL OF A BUILDING. — Part of the wall of a building on the corner of Chestnut and Third Streets, St. Louis, owned by Col. George Knapp, while being pulled down May 14, fell and carried five men to the ground with it, injuring all more or less.

UNSAFE BUILDINGS IN CHICAGO. — One of the architects of Boston has recently returned from a visit of inspection to Chicago, where he went as the representative of capitalists who hold mortgages on buildings which have have represented to be in a bad condition. It is said that the buildings erected after the great fire were constructed with great haste and in such a manner that many of the finest stores have been injured by dry rot. Large green timbers were covered in, and by the addition of paint were so incased as to be air-tight, and the rot has been so active that the buildings are unsafe. Some of the stores are being strengthened in various ways, for the supports were inadequate.

MONUMENTS. — The New London County Historical Society has received the design of the monument which the society proposes to erect as a memorial of the defeat of the Pequots, and the destruction of their famous stronghold near Mystic. It consists of a granite shaft of the Ionic order, standing on a rectangular base of the same material, ornamented with bronze tablets of elaborate designs, and the whole surmounted by a colossal statue of the hero of the battle, Capt. Mason, who led the little band of colonists in the hazardous conflict. The estimated cost of the monument is $5,000.

The corner-stone of a monument dedicated to the Confederate dead was laid at Chattanooga, Tenn., May 10, with Masonic rites. A detachment of United States troops, with the Second Infantry Band at their head, participated. The people joined in decorating the graves of Confederate soldiers amid the utmost good feeling.

STONEWORK FOR THE ST. LOUIS POST OFFICE. — There are about 350 men employed in the granite-quarries at Hurricane Island, Me., who are at work on the St. Louis Post Office contract. Each of the window-caps takes two men six months to finish, weighs about four tons, and costs $1,700. The caps (about two feet square) which cover the pilasters cost $1,500 each. There are seventy-five in all, and it takes a skilled workman from ten months to a year to make one. The quarries have been worked for this building a year, and it will take two or three more before it is done.

THE STEWART MEMORIAL CHURCH. — The Stewart Memorial Church at Garden City, L.I., which is to stand as a monument for Mr. A. T. Stewart, and is to contain in its basement a mausoleum for his remains, is rapidly rising upon the foundation, which was completed on the 1st of November last. The walls are at present ten feet high all around, and the date of its completion is positively fixed for August, 1878. The extreme length of the church, or cathedral as it is called, is 143 feet outside of the buttresses. Its height to the ridge of the roof is to be 69 feet; to the top of the spire, 204 feet; the width of the transept, 75 feet; and across the body of the church, 50 feet. The outside is to be built of Belleville and the inside of Berlin and Ohio stone.

THE DRAINAGE OF NEW ORLEANS. — The *Commercial Advertiser* says that the present drainage of the city of New Orleans is carried on by means of four draining machines or engines, located in different sections of the city, so that the water which falls on the different sections, together with a large part of the sewage, is conducted by open gutters and ditches to the draining point, whence it is lifted by machinary to the level of Lake Pontchartrain, into which it is discharged through the agency of a tail-race connecting the draining machines with the lake.

THE WEIGHT OF BUILDINGS. — It has been calculated that the pressure per square foot of the superstructure upon the foundation walls of a few of the best-known buildings is as follows: —

The new dome of the United States Capitol at Washington	13,477 lbs.
Girard College, Philadelphia	13,440 "
St. Peter's, Rome	33,330 "
St. Paul's, London	39,450 "
St. Genevieve, Paris	60,000 "
Le Toussaint, Angers	90,000 "
While the pressure per square foot upon the earth is in the case of St. Paul's, London	42,950 "

DESTRUCTION OF A PERUVIAN TOWN BY AN EARTHQUAKE. — A despatch received from Valparaiso states that the town of Iquique has been destroyed by an earthquake and tidal wave. Iquique is a small seaport town of Peru, in the department of Arequipa, on the Pacific coast. The population is somewhat over 1,000.

ENGLISH ART ACADEMY AT ROME. — It is now seriously proposed to establish in Rome an English art academy similar to the French academy at the Villa Medici.

CHAPEL-BUILDING EXTRAORDINARY. — The Wesleyans in England propose to raise funds for the erection of a thousand new chapels to be built at the rate of a hundred a year.

A HEAVY BLAST. — At a quarry near St. Blazey, Cornwall, a heavy blast lately threw down about 700 tons of granite, causing very little breakage. One block, without flaw or discoloration so far as can be seen, contains about 8,000 cubic feet or nearly 600 tons. There are several smaller fragments which weigh from 30 to 60 tons each.

POPERY OR NO POPERY. — The Established Church of England is agitated just now as to whether it is allowable to use brass eagles with outspread wings as lecterns. The opponents to the custom, which is quite a common one, say that as in heraldry the eagle with outspread wings represents a prince of the Roman Empire, i.e. the Pope, its use is not to be tolerated. The supporters of the custom see in it only a symbol of the Evangelist St. John.

THE ROYAL CHAPEL, WHITEHALL. — It is said that the walls of the Royal Chapel, Whitehall, have not received a coat of paint since the reign of King William IV. more than forty years since; also that the organ is so much out of repair that many of the pipes are tied together by strings.

THE COSSALL GIANTS. — A monument has just been erected at Cossall near Nottingham to the memory of three famous soldiers known as the Cossall giants, because they were all men of extraordinary stature, and distinguished themselves in charging Napoleon's guard at Waterloo. It is recorded that Shaw, of the Life Guards, killed ten men with his own sword before he was himself killed. The monument is a marble obelisk fifteen feet high, at whose base is sculptured a life-guardsman's armor.

FIRE AT THE CATHEDRAL AT METZ. — On May 6, during the service in the Cathedral at Metz, at which the Emperor William, the Crown Prince, and Gen. Von Moltke were present, the interior decorations were ignited by the careless use of fireworks burned in honor of the visitors; and before the fire could be extinguished the roof was burned, and much of the interior damaged. Another account states that the fire broke out at four o'clock in the morning, and was caused by the illuminations.

THE FRENCH PULPIT FOR ST. PAUL'S. — The Dean of St. Paul's Cathedral has written to the Lord Mayor to say that the carved pulpit valued at £1,400, which is offered by the *Chambre Syndical des Ouvriers Menuisiers en Bâtiment* will be gratefully accepted, and promises that it shall be placed in the nave of the cathedral.

CANTERBURY CATHEDRAL. — About $75,000 are needed to carry out the proposed restorations.

THE GOBELINS. — The commission which was appointed by the Minister of Public Instruction to report on all questions relating to the future prosperity of the manufactory of the Gobelins has offered the following recommendations: In future no tapestry will be produced at the Gobelins except from designs especially prepared. The designs are to be obtained by public competition in accordance with programmes issued by the commission. An annual competition is to take place between students in the Gobelins school who have served three years apprenticeship, the successful competitor in which is to follow the course at the *École des Beaux-Arts* for two years at the expense of the state. The drawing-classes at the manufactory are to be extended, and the students are to be taught the theoretical principles which govern the art of tapestry-making. The process of reproduction is to be simplified. The manufacture of velvets is to be restricted to wall-hangings, the chemical course as applied to dyeing is to be re-established, and the laboratory opened to out-door students.

ORIGIN OF PETROLEUM. — M. H. Byasson has been led by the following experiment to give a scientific explanation of the formation of petroleum: If a mixture of vapor of water, carbonic acid, and sulphuretted hydrogen be made to act upon iron heated to a white heat in an iron tube, a certain quantity of liquid carburets will be formed. This mixture of carburets is comparable to petroleum. The formation of petroleum can thus be naturally explained by the action of chemical forces. The water of the sea, penetrating into the cavities of the terrestrial crust, carries with it numerous materials, and especially marine limestones. If the subterranean cavity permits these new products to penetrate to a depth where the temperature is sufficiently high, in contact with metallic substances, such as iron or its sulphurets, we have a formation of carburets. These bodies will form part of the gases whose expansive force causes earthquakes, volcanic eruptions, etc. Petroleum is always found in the neighborhood of volcanic regions, or along mountain chains. In general it will be modified in its properties by causes acting after its formation, such as partial distillation, etc. Petroleum deposits will always be accompanied by salt water or rock salt. Often, and especially where the deposit is among hard and compact rocks, it will be accompanied by gas, such as hydrogen, sulphuretted hydrogen, carbonic acid, etc. — *Revue Industrielle.*

PORTLAND STONE. — Portland stone is nearly pure limestone. It is denser than the oölitic limestones, weighing from 135 to 147 pounds per cubic foot. To this series belongs the well-known Caen stone, which is obtained from quarries in Normandy. It has been used in England since the time of the Norman conquest, and in Ireland from a possibly more remote period. It is not however to be trusted for external use in England at the present time.

FOREIGN THEATRICAL DISASTERS. — It is said that in 1772 about eight hundred people lost their lives in a burning theatre at Amsterdam; the burning of the theatre at Saragossa, Spain, during the same year, caused the death of nearly one thousand persons; in 1781, nearly five hundred persons were burned to death in the Palais Royal; when the Café d'Istria Theatre fell and took fire, nearly one thousand persons were crushed and burned.

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West Elevation of House for Bryce Gray, esq., Long Branch, N. J. Potter & Robertson, Architects, New York.

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JAMES R. OSGOOD & CO. BOSTON

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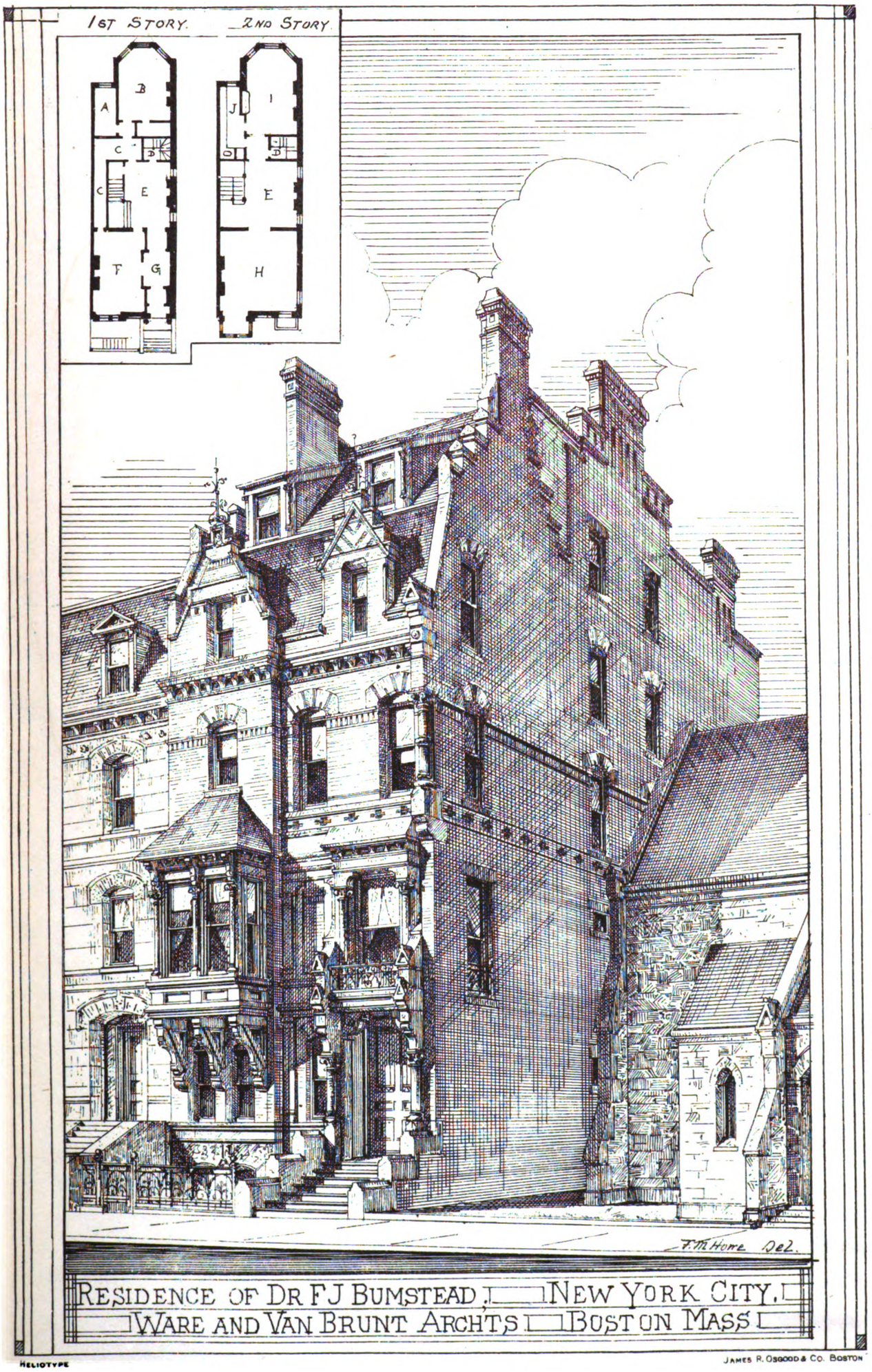

RESIDENCE OF DR F J BUMSTEAD, NEW YORK CITY.
WARE AND VAN BRUNT ARCHTS BOSTON MASS

HELIOTYPE
JAMES R. OSGOOD & CO. BOSTON

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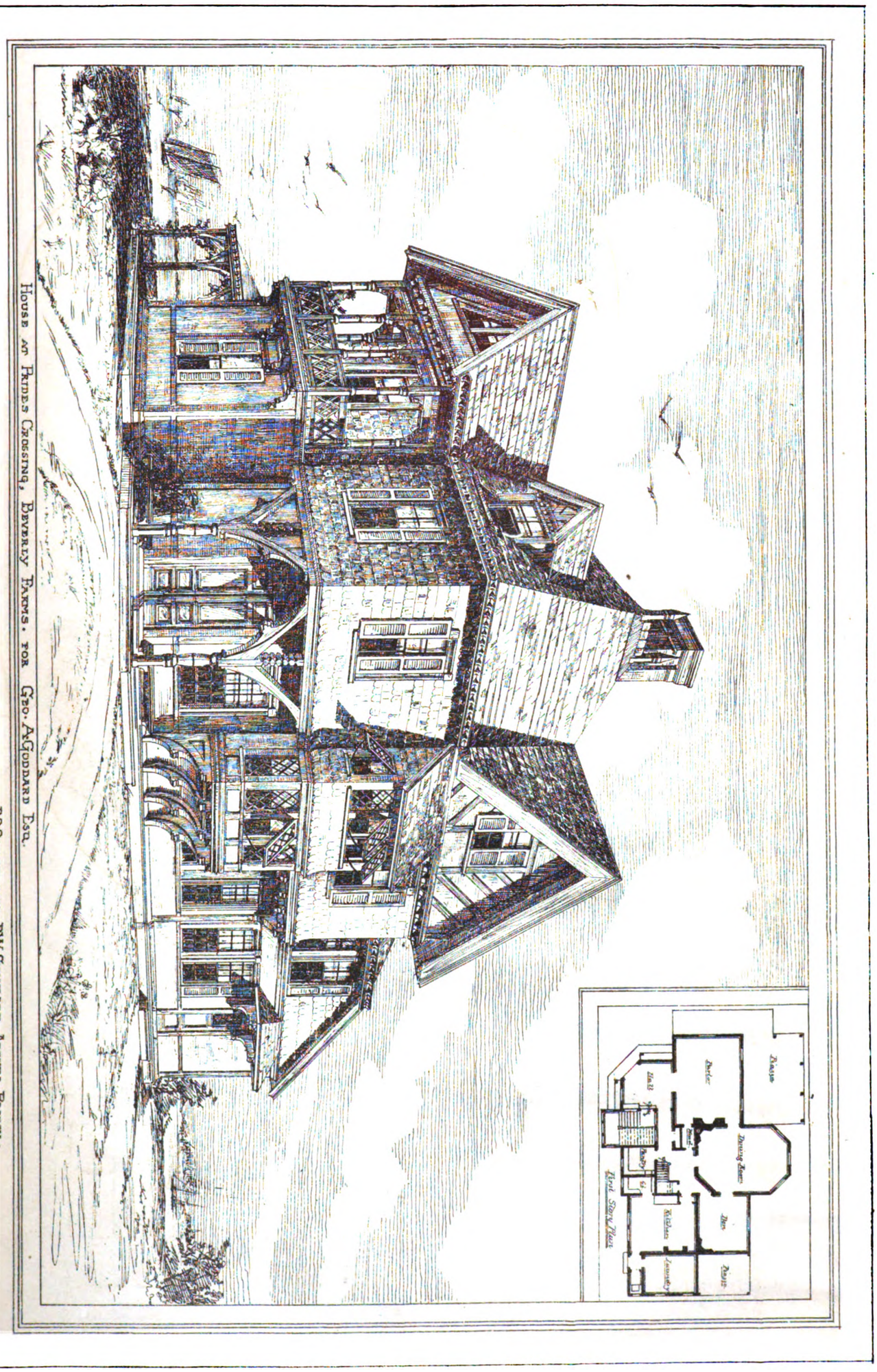

HOUSE AT RIDES CROSSING, BEVERLY FARMS. FOR GEO. A. GODDARD ESQ.

E. C. CABOT AND F. W. CHANDLER ARCHTS, BOSTON.

HELIOTYPE

JAMES R. OSGOOD & CO. BOSTON.

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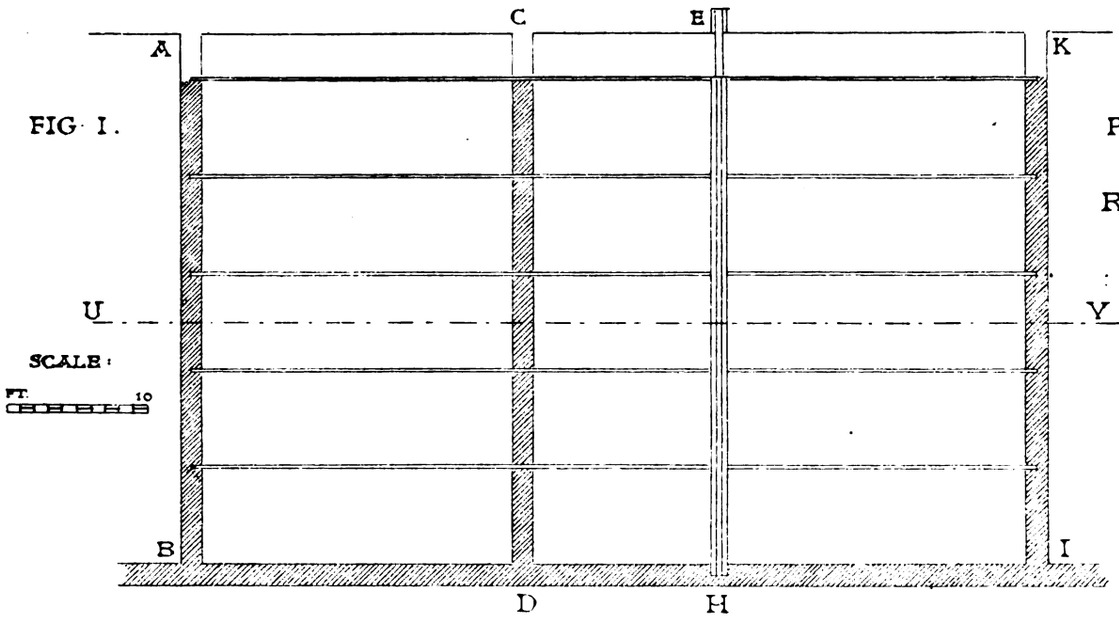
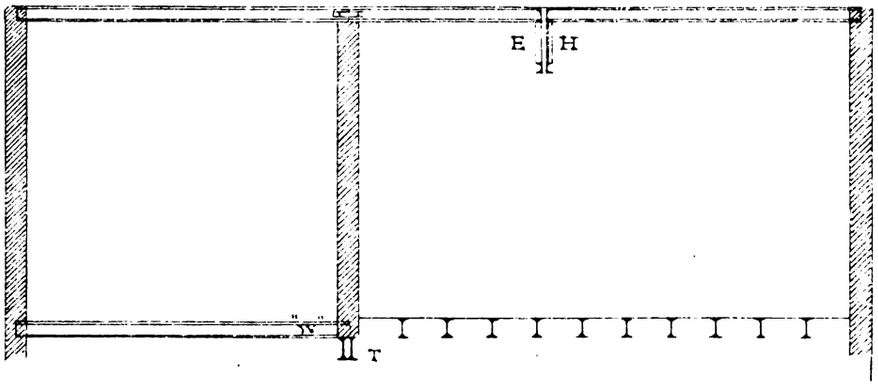
FIG. 1.



PLAN OF ROOF.

FIG. 2.



SECTION ON LINE U-V SHOWING MODEL TRUSS, AND WALL IN PLACE

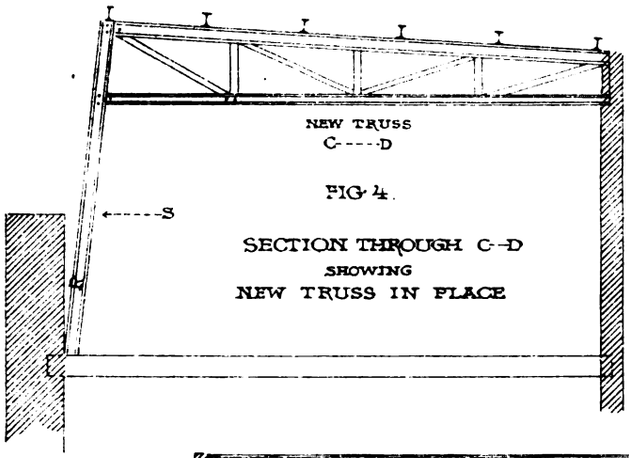


FIG. 4.

SECTION THROUGH C-D SHOWING NEW TRUSS IN PLACE

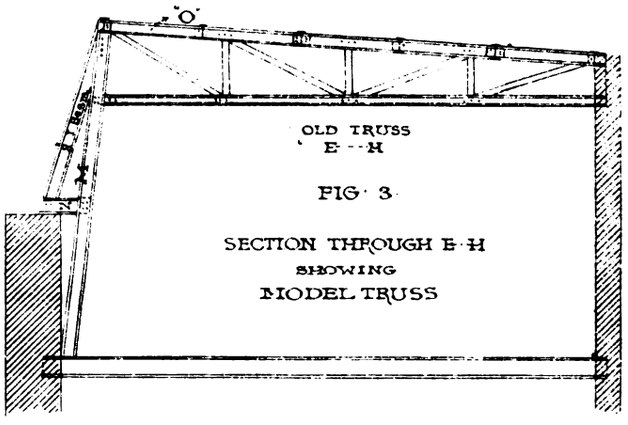
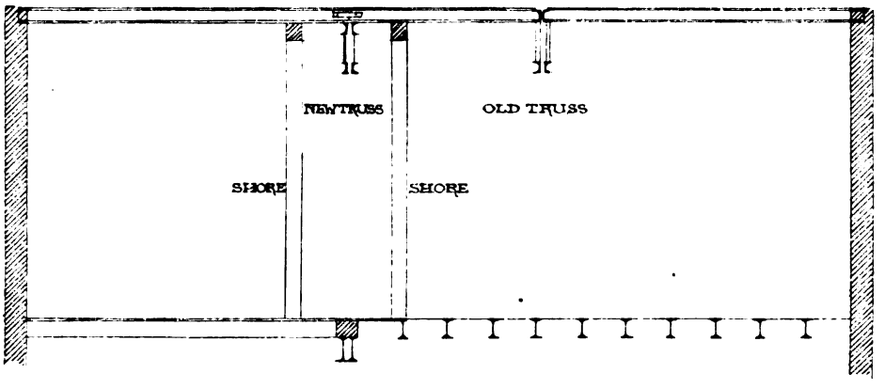


FIG. 3.

SECTION THROUGH E-H SHOWING MODEL TRUSS

FIG. 5.



SECTION THROUGH LINE C-D SHOWING NEW TRUSS IN PLACE BEFORE SHORES WERE REMOVED.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, MAY 26, 1877.

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THERE is at the time we write no official announcement of the results of the investigation into the fall of the Rockford Court House; but the reports that are published of the testimony before the coroner's jury seem to indicate that the conduct of the building was unwise and careless, if not discreditable, from the beginning. The whole undertaking has the look of being scrimped and shabby, of an attempt such as we see only too commonly, to get a fine building without paying the cost of it. In the beginning the architect seems to have been "skinned" unmercifully, — whether he offered himself up to be flayed or not, we do not know,— for we find that he was not employed to see his work carried out, but agreed to furnish plans, specifications, and complete drawings of the building, for a commission of two per cent on an assumed cost of $104,000. The contracts for the building amounted to about $200,000; and so Mr. Gay was to do all the work for which by common custom three and a half per cent is charged, for about one per cent of the cost, or the fee that is assigned by usage for preliminary sketches alone. When work is begun in this way, one is pretty apt to find that it is shabbily managed at other points. Accordingly we are not surprised to hear that the architect, who agreed to visit the building when called for in consultation, was rarely called upon, and that the building-committee chose for their superintendent one of their own number, who was not a skilled superintendent, but a farmer who professd a knowledge of the building-trades; nor to see indications that the construction of the building was made as slight as anybody dared make it, and that hasty work and poor material were put into it.

As to the giving way of the piers, it seems to have been no more than might have been expected if anybody had taken the precaution to compute the weight that was to come upon them, which it does not appear that anybody did till they had fallen. There is a considerable variation in the estimates of the load, the architect claiming it to be about a hundred tons on each pier, while the contractor computed it to be exactly 130 tons and 415 pounds, an estimate which he on his second day's examination increased, the reports say, to 250 tons. The contractor claims to have felt and expressed much uneasiness about the strength of the building, and to have put in extra iron at his own cost; but this did not make him investigate the strength of his piers, nor take pains to build them solidly, for it is in evidence that the brick of which he built them was poor, that they were laid without wetting, in mortar without cement, with wide joints, that the interior was filled in with "bats," and that there were no bond-courses in them. Now if the crushing weight on hard brick be taken at one thousand pounds per square inch, which is a fair standard, we have a pressure of seventy-two tons per square foot, which would be more than enough to crush the best pier that could be built of the material, while for ordinary brickwork a prudent engineer would hardly allow a permanent load of more than a tenth of that, or seven tons per foot; to allow more than a sixth, or twelve tons, would be thought hazardous. The piers had barely six square feet of area, and the lowest estimate, the architect's, of the weight on each of them was a hundred tons, or more than sixteen per foot, while it seems probable that it was twenty or more. The architect had specified that the brick should be the best of hard-burned, that they should be laid with thin joints and in mortar mixed with cement, and if laid in summer should be well wetted. He testified with surprising boldness that his piers if so laid would have safely carried a weight of thirty or forty tons per square foot. On the whole it is difficult to avoid the conclusion, if we may trust the testimony that we read, that the piers were inadequately planned by the architect, and badly slighted in the execution by the contractor. We see no indication that the superintendent exercised any influence on the work, or that anybody thought it worth while to ask his opinion after the disaster had occurred.

GOV. ROBINSON of New York has vetoed the legislative appropriation for continuing the State House at Albany, and in his message on the subject calls the building a great public calamity, saying that the cost of it cannot be estimated, and that the expense of maintaining it will be a quarter of a million of dollars. The building has been the subject of a long battle in the Legislature and in the newspapers this winter, between the supporters of the commissioners and the Advisory Board on the one hand, and the party on the other who wished to reinstate the original architect and his designs. The bitter quarrelling which goes on over the undertaking, and the degree to which politics have been mixed up with it, as they have a fatal facility for being with any undertaking that involves the spending of a good deal of money, have kept it before the minds of the people until they seem to be heartily weary of it. Were it not a rather appalling thing to deliberately throw away an unfinished building that has cost eight millions of dollars, it is quite possible that the proposition might prevail which is always in the background, and hostility to which, it is said, was one of the inducements to sink so much money in Albany by way of guaranty, — the proposition, we mean, to abandon Albany altogether and move the State government to New York.

THERE is no doubt that the building has been enormously costly in its earlier stages, and it is not strange therefore that tax-payers should look forward with anxiety to its future progress; but it would be hard to suggest a more disastrous measure of economy than stopping short on it in its present condition. Gov. Robinson thinks there is no knowing how much it is still to cost; yet there is hardly a more efficacious way of increasing the cost of a building than to work upon it intermittently. To say nothing of eight million dollars lying idle so long as the building is unused, involving a loss of a half-million of dollars or so annually in interest, it will not take long neglect to deteriorate the part that is built to the amount of another half-million. The reasonable way to quiet the popular alarm would seem to be to put the building under contract, which it ought not to be difficult to do now if the plans of the Advisory Board have been executed with the thoroughness which people have been led to expect. The Albany *Journal* says that bids have been received from responsible builders for finishing the building for four millions of dollars, or without the tower for two and a half. This does not vary greatly from the amount proposed by the Advisory Board. To let the building out by contract would be to guard against political trouble at more points than one apparently; for the workmen who are employed upon it absolutely threatened violence against the members of the Legislature who voted to sustain the governor's veto, and it was thought necessary to set a special guard about his house. As architects, while we are altogether unacquainted with the modifications which the Advisory Board have made in their first designs, we may give our opinion that if the delay caused by the governor's veto should have the effect of preventing the introduction of some marked incongruities of style in the building there

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would be some compensation for it. The appropriation of one million which the governor vetoed was saddled with the provision that the exterior of the building should be finished in the style of the original design, which possibly was the real reason for the veto. A second bill has just been passed by a majority of both houses large enough to override a veto. It appropriates only half a million: we do not hear that it meddles with the question of style.

DR. SCHLIEMANN'S paper on the architecture of Troy, read at the meeting of the Royal Institute of British Architects at which he was made an honorary member of that association, gives a very interesting summary of the character of the earliest remains he found at Hissarlik, and the inferences which he draws from them as to the way in which the ancient town was built. It was evidently, he says, a town not of masonry, but of wood. The remains were those of houses, towers, and walls of defence. But all the walls that he found were built of sun-dried brick or of stones laid in clay or mud. None of the house-walls were more than six feet high, nor was there room to suppose that they had ever been higher than a single story, both because of their structure and the absence of débris, and because they are buried in a deep layer of wood-ashes amounting to some six feet, such as could hardly be found except where the buildings had been of wood, but which is quite in keeping with the old poets' stories of the conflagration which followed the sack of Troy. The enormous quantity of ashes astonished him, even on the theory that the houses must have been five or six stories high; but the mass of the deposit was made in no small degree of the pottery that was found in it, among which were immense numbers of jars and barrel-like vases of terra-cotta, many of them from four to seven feet high and from two and a half to five feet wide, with shells two or two and a half inches thick. These had apparently been needed in great quantities as receptacles, for the reason that the Trojans had no cellars. It appeared too that household utensils, tubs and buckets for instance, were of baked clay; and Dr. Schliemann had even found wall-hooks for hanging made of terra-cotta, with holes in them through which they could be nailed to the wall. The rubbish was also swelled by great quantities of oval stones, millstones doubtless, and weights or other implements of stone.

NOT only the common houses, but the royal palaces and even the walls and towers of the fortification, says Dr. Schliemann, must have been of wood. The existing walls of the great tower are only twenty feet high; and the fact that they have a batter of fifteen degrees from the vertical shows that they could not have been much higher, a conclusion which is confirmed by the fact that they are encumbered not by their own débris but by heaps of wood-ashes, and by stone implements and millstones which have fallen upon them from above. The same is true of the walls of the town, which are of the same slope and materials as those of the tower, being cyclopean masonry of large blocks laid in clay. A broad double gate opens through the walls toward the south-west, and the masonry of it shows marks of a violent fire, which even left an unmistakable trace on the pavement of broad flagstones close against it. Dr. Schliemann fortifies his theories by recalling as a parallel example the accounts given by Diodorus Siculus and other old writers of the town of the Mossynoikoi on the Euxine, which was fortified with wooden towers seven stories high, and by describing the ruins of other towns of similar structure which have been discovered elsewhere. It is evident from this account and from some topographical discrepancies which he mentioned that if Dr. Schliemann's Troy and Homer's are the same, — as is probable, we suppose, — Homer described it from tradition or from imagination, and without having seen its site. The small and not very wealthy town of some five thousand inhabitants which the German explorer imagines, with its walls of wood and clay, and its frugal utensils of terra-cotta taking the place of the more expensive bronze and other metals, does not carry off very well the splendors of the Iliad; but the Doctor's accounts of it have a look of uninvented positiveness which seems enough like reality to carry conviction.

A LATE number of the *Builder* contains an account taken from Lanciani's *Bulletino della Commissione archæologica municipale*, of the subterranean hall which was discovered in Rome not long ago, on the Esquiline Hill, in what are considered to be the gardens of Mæcenas, and which has been called, for want of a better name, the lecture-hall of Mæcenas. It is a room of about thirty-two by seventy-eight feet, and was about forty-five feet high, thirty feet or so of the height having been set below the ground, apparently for the sake of making the room cool in summer; it had therefore no windows, but was lighted by skylights in the vaulted ceiling, and fragments of glass found upon the floor have led to the inference that these skylights were glazed. The room had been handsomely finished, with marble pavement, and walls and ceiling in stucco, a rich cornice at the springing of the vault, and a dado. On the walls, instead of windows were niches richly painted with landscapes, — blue skies, trees, flowers, and birds, — and against the cornice and dado were friezes or bands painted with mythological subjects. The paintings are said to be admirably executed, — better than any at Pompeii, — and their excellence has tempted the discoverers to ascribe them to a certain artist mentioned by Pliny, who made himself famous by introducing landscape decoration into apartments. At one end of the room appears to have been a tribune; and the other end, which is semicircular, has seven concentric steps or benches, like those of an amphitheatre. The inference of archæologists is, that the hall was used for literary meetings, readings, and the like, such as it was the custom of Mæcenas and other dilettanti to maintain during the earlier empire, and for which in the hot summer weather the coolness of an underground room would have been especially agreeable.

NEW BOOKS.

EXAMPLES OF BUILDING CONSTRUCTION.[1]

THERE are certain necessary commonplaces in every calling which those who practise it pick up sooner or later during their pupilage without exactly knowing how, but irregularly and at intervals, and in their knowledge of which they are apt for a good while to keep finding awkward gaps, simply because there has been no provision for learning them systematically. This irregularity in learning is one of the chief reasons why learners in offices or shops take so long time to master the technicalities of their business. The necessary points come up sooner or later, but to any individual some of them are long in coming, and it may be that the first time they come, and even the second, they are forgotten because his way of learning gives him no system in which they find place. This is especially apt to be the case where work is so irregular and varies so much in kind as in an architect's office. Any publication which gives clearly and methodically the technical commonplaces which the beginner needs to know, and gives them in the form in which they come up in actual practice, ought to be a valuable help to architectural students. The thing has been attempted from time to time in a variety of publications, but nothing that we know, at least among American works, succeeds so well in the limited field which it assumes to cover as the "Examples of Building Construction" prepared by Prof. Ware, and published by Prang and Co.

The aim of the series is modest. It gives in a set of plates lithographed in colors the complete set of drawings which an architect would prepare for building a small country house of wood. It is divided into four parts, each of twelve plates, of which the first part gives the floor, foundation, and roof-plans, four elevations, and a section with scale drawings of outside finish and chimneys. The second part gives framing plans of floors, elevations, and roof; and in addition several sheets which show details that architects do not include in their drawings, since all competent carpenters know them, — with which all students ought to make themselves familiar, though it is to be feared that comparatively few do, — the common methods of framing and connecting sills, posts, girders, joists, studs, plates, and rafters; the

[1] Examples of Building Construction, with Suggestions to Teachers and Pupils for their practical use. Prepared by William R. Ware, Professor of Architecture at the Massachusetts Institute of Technology, and at the Massachusetts State Normal Art School. Four parts of twelve plates each, with letter-press. Boston: L. Prang and Co., 1876.

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setting and bridging of floors and partitions, as well as the usual ways of joining timber by scarfing, splicing, fishing, etc. The third part contains scale and full-sized drawings of inside finish, — doors and windows, architraves and base mouldings, stair-finish, chimneys and fireplaces. These three parts thus contain a complete set of drawings for a wooden house, in the ordinary form, colors, and scale, and include every drawing that would be furnished for carrying out the work, except such full-sized details of outside finish as would be too large to put upon ordinary sheets. They will serve the student as a complete model set of plans and working-drawings. In the fourth part are several illustrations which are likely to be useful to the student in practice, — sketch plans on a small scale, and elevations of alternative designs developed from them for execution in wood, brick, and stone; with scale drawings of the necessary exterior details to suit each material. The small accompanying pamphlet of letter-press gives directions to the student for copying the drawings, and explanations of the constructions represented in them; with suggestions to teachers of how the examples given may be most usefully employed in teaching.

The value of the work is in its clearness, and the fact that it shows exactly the things that are done in the ordinary practice of an architect's office, and in just the way in which it is customary to do them. No difficult or unusual constructions are shown, nor any ingenious devices of individual architects; but only such processes as are familiar to all capable architects and builders. The scope of the work includes merely the details of construction that are shown in the customary drawings, omitting both in the illustrations and descriptions such as are reserved for specifications, or intrusted to the recognized habits of workmen, — for instance, nailings and fastenings, furrings, the arrangements of slates, shingles, and clapboards, flashings, etc. Matters which pertain directly to the subordinate building-trades — plumbing, arrangement of drains, roofing, heating, etc. — are omitted or only incidentally illustrated. On the other hand, while all the designs are very simple, care and judgment are shown in making the plans include as much variety in the common kinds of work as was practicable, even at the expense of giving a somewhat miscellaneous look to the general designs. Thus the principal example is made to combine a mansard with a plain pitched roof, and to furnish two kinds of dormers, and three of window finish, with both double-hung and French sashes. Of course, where a book can contain but a selection from a great store of information, any examiner may suggest things which he would have thought it worth while to add; and in a country where the practice of building varies in different parts, as it does in the United States, local peculiarities must be passed over. The most that can be done is to furnish the beginner with a nucleus of technical knowledge, around which he may arrange the facts that he collects in the course of his work; and this seems to be done in a very practical, serviceable manner. In such a work the design of the illustrations is altogether a secondary matter; and the intention of giving only instances of the most ordinary constructions naturally leads to the use of common forms. Nevertheless we should have been glad to see a little more effort made to give interest and spirit to the detail of the drawings.

The accompanying "suggestions" are admirably clear and to the point. They amount to a concise and pretty complete treatise on the mechanism of architectural drawing, and give besides, sufficient explanation of the constructive meaning and purpose of what is shown in the drawings, as well as a good deal of incidental information of practical value.

LINEAR PERSPECTIVE.[1]

The first instalment of Mr. Honey's book on Perspective does not carry the student very far, but he gets far enough to taste its quality and to judge whether it is the book he has been looking for. If he is a student of architecure, he will probably decide that it is not: and he will be right. Its methods are too formal for his purpose; for perspective treats of the actual appearance of things, and one needs only to have his attention called to the facts with which it deals, to understand it at once. Its rules become a matter of common sense hardly needing demonstration; for what is the use of proving the correctness of results that are justified by mere inspection? To the practical draughtsman it is merely a borrowing of trouble, to go behind the phenomena, and, first stating the facts according to the artificial methods of descriptive geometry, to deduce from them by a logical process what the appearances ought to be. This would be the only way for the blind, and is suitable for geometers, who see only with the eyes of the mind; but it seems back-handed and roundabout to persons trained to observation.

In spite of its merits, then, we cannot recommend this work to our readers for practical use. It is suited rather to the atmosphere of the scientific school, its native clime, than to that of an architect's office or the painter's studio. But young men fresh from their "Descriptive" will find its mode of attack a natural one, and will enjoy the cleverness with which a new set of facts are reduced to order by familiar methods.

Every writer on perspective enjoys putting his old facts into a new form; if he cannot do this, indeed, there is no occasion for his writing at all. How much absolute originality there is in Mr. Honey's new methods, we are not deeply read enough in this literature to say. They are neat and elegant, and the figures are easily understood. But it seems unreasonable to give all the steps of the famous method of shadows for finding the axes of an ellipse, and not to explain the rationale of the process.

The book is handsomely got up, somewhat too handsomely, perhaps, for a school-book.

[1] *Linear Perspective*, Part I. By Frederic R. Honey, Instructor in Descriptive Geometry and Perspective in the Sheffield Scientific School, and in the Yale School of Fine Arts. New Haven: Judd and White, 1877.

STUDIES OF INTERIOR DECORATION.

IX.

CONCERNING FURNITURE.

WE have in these studies been mainly concerned with the architectural completion and decorative treatment of the walls, ceilings, and floors of certain rooms, whose form, size, and destination are of common occurrence in city houses. We have endeavored to indicate by examples how close is the relationship between the constructional and the decorative work in each case, and how the latter is developed from the former by processes of reasoning. Our object has been and is to give greater dignity to the arts of interior decoration, by pointing out that a result of *perfect fitness* in any case cannot be obtained unless these arts are made subservient to a general scheme developed out of the requirements and opportunities of the subject. Their value is in their interdependence; it is relative and not absolute. Thus a paper-hanging or a stuff for drapery or a carpet is not to be selected because of its own excellence or beauty, but because of its adaptability by color and form to aid in the expression of an idea; and this idea is not a caprice or a mere matter of taste or wholly of artistic feeling, but a deduction from the necessities of the subject, a definite scheme or thought, which can be explained and defended.

We have hitherto refrained from touching upon the details of furniture, not because we considered furniture an unimportant factor in any scheme of interior decoration, but because while discussing rooms we desired to confine ourselves to their walls, floors, and ceilings, for the sake of clearness of statement, leaving the question of the contents of rooms to be considered at a later stage.

Concerning furniture, so much has been written of late at home and in England by architects, by amateurs, and by men and women whose business is literature in general and not art in especial, so many absolute principles have been laid down, such positive lines of demarcation have been drawn between good and bad, such rigid exclusions and inclusions have been fixed, and withal no two writers quite agreeing, many absolutely disagreeing, but all speaking *ex cathedra*, that the subject seems at the moment in hopeless confusion. The intelligent public, however, have imbibed from these writings a distinct idea, that in selecting or ordering their furniture, there are other things to be considered besides comfort, taste, and cost; they have an uneasy sense that they must also consider and give weight to certain higher duties in making their choice or giving their commissions; these duties have relations with art, but among the conflicting authorities they are not defined with sufficient distinctness to be in working order. Doubtless the principle of *truth of construction* is the most characteristic and most prominent feature of these discussions; but this principle is interpreted in various manners, and with a various latitude of application.

The vast accumulation of historical precedents, and the convenient publication of them in books, prints, and photographs, so that they are accessible to every student, has created the spirit of eclecticism which since the beginning of the century has distinguished the works of architects and designers from those of their predecessors. This spirit has made prominent in art a subjective or self-conscious element, which before the eclectic era

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found but feeble expression. It seems evident that during the existence of a prevailing or exclusive style, as in any time previous to the middle of the last century, there must have been much less scope for individuality than now, when the necessity of making choice among many styles and among innumerable *motifs* constantly recalls the artist to a consciousness of his own resources, and in the new labor imposed upon him of rejecting with discretion, compels him to an expression of his own peculiarities of thought and habits of mind. Thus the respective characteristics of Vignola, Scamozzi, Serlio, or Palladio, working together in the narrow field of Italian Renaissance, are not so evident, and do not contrast with each other, as do those of Henri Labrouste working in his Neo-Grec style, of Lassus in his French Gothic of the thirteenth century, of Burges in his Cluny Gothic of the twelfth century, of Scott in his English of the thirteenth, of Street in his Italian of the thirteenth, of the Scotch Thompson in his revived Greek, of Norman Shaw in his "Queen Anne" style, and so on through a host of more or less illustrious contemporaries, and most of these changing their styles from time to time, according to their moods.

This eclectic and self-conscious spirit is as evident in furniture and in the decorative arts as in architecture; it is expressed forcibly in that appearance of *effort* more or less artfully concealed (as in an actor playing a part), which distinguishes modern design from the *naïveté*, the innocence, the unconsciousness, of old work.

The application of a rule of morality to the arts of design follows naturally, and is in exact harmony with the modern spirit of self-examination and culture. Thus the idea of truth or honesty finds expression in the dogma that construction must be the main *motif* of decoration, that decoration must express the structure, or at least must not be inconsistent with it. Architecture has reaped undoubted benefit from the observance of this principle. It has also been applied in the production of chairs, tables, and cabinets, with a degree of rigor and self-denial which in the conduct of a man's life would be deserving of all praise.

The most characteristic result of this discipline has been what the dealers advertise as "the Eastlake style," the productions of which, as they claim to be free from the mendacity, the insincerity, and worldly ostentation of other styles, may be distinguished as moral furniture. The works of this new dispensation are too familiar to need detailed description. Its great merit consists in the fact that it has a recognizable individuality based upon a principle of art; that its types are simple, and are capable of suggesting many beautiful forms. It is, however, a style very easy to travesty, and in unworthy hands is as apt as its predecessors to commit the unpardonable sin of seeming to be what it is not, and appearing to do what it does not.

To the architectural designer the revival of mediæval principles in furniture must ever be regarded as the most significant incident in the history of this branch of art; and this not because the principles are mediæval, but because they are principles. The revival of the style itself is a comparatively unimportant incident; it is a fashion of design which will pass away in due time and give place to other revivals in accordance with the constant demand for new things. Indeed, its limitations are too positive to allow of that scope, elasticity, and variety which are essential to enduring popularity, or to that very wide range of expression required by modern usages. Its square outlines, its foliated arches, its notched, embattled, and billeted mouldings, its stunted columns, its cuspated panels, its chamfered edges, its heavy corbels, its pinnacles, crockets, and gables, its straight legs and arms, its wrought hinges and straps, its apparent framing, its affectations of rude workmanship — all these peculiarities are interesting, but insufficient in their adaptation to the various degrees of domestic comfort and elegance, and (what is more important) they are not *necessary* to the principles which they first served to illustrate. The principles are permanent; the form is ephemeral. They are not to be confounded.

In practice the dogma of truth in construction as regards furniture in especial includes these principles: The structure is not to be denied or concealed by the decoration; glue is to be used as an aid to, and not instead of, framing; veneering is disallowed except in panels; straight-grained woods are not to be cut or "shaped" into such wanton curves, especially in the bearing members, as will interfere with their natural strength.

The observance of these principles does not confine us to forms known as Gothic. Every desirable quality of expression contained in the styles of furniture which have come down to us is possible and allowable under these wholesome limitations. Moreover, to an art which is obviously intended to minister to our smaller comforts, and which belongs to the minor elegancies of life, the strict application of severe principles of design is apt to be cumbersome. A domestic chair or table is not properly a monument: it is a matter of convenience; and considering it from a purely artistic point of view, while the walls and the constructional permanent features of a room may very properly be submitted to the just strictures of a law in their design, in the movable furniture, so long as it is well made and harmonious in character with the room, a certain degree of graceful caprice or elegant play of imagination is commendable. Indeed, may it not be considered derogatory to the dignity of a law to make it an incumbrance to such minor matters? The law is useful to prevent extravagances and barbarisms, such for example as would interfere with the durability of the object, or put it out of keeping with the architectural surroundings, or render it an inconvenience instead of a comfort, or in any way offend against the instincts of good taste; but it is dangerous to set down too rigorous limitations of design in such things. Thus the excellent Mr. Eastlake forbids us to curve the legs, arms, or backs of our chairs; and the result in seven cases out of ten must be discomfort and inelegance. It may be good moral discipline, but it is not good art, to put such an unnecessary strain upon our resources of design. The principle is good, but it should be applied with discretion.

In fact, the law of the "survival of the fittest" has placed at the disposition of the designer all the best works of past ages; and we may well distrust any principles, the observance of which effects among these any great exclusions. All ages have produced bad furniture in quantities, and happily, in obedience to this great natural law, the weakest and worst has passed into merited oblivion; but the best remains, and all the wear and tear of time and hard usage have only served to make it more venerable and more worthy of admiration and study. All good architecture has been accompanied by good furniture, and much of this remains for our instruction in historical collections, in prints, in paintings as accessories, or in actual examples, handed down from from generation to generation in our own or our neighbors' households. The Italian, English, and French Renaissance, during those periods when the best architectural design and workmanship prevailed, is fertile in beautiful *motifs* for domestic use. In those periods the architects designed furniture, and brought to bear upon it the same sound principles of design and construction which have made their greater monuments endure for our admiration. But in all cases these principles yielded somewhat of their rigor to the feeling that furniture calls for a more delicate scale of design, more minute details, and a more ornate and playful treatment. The great mediæval designers allowed themselves the same latitude of expression; and wherever the furniture of their great churches and castles has been spared by revolutions and by ignorant bigotry, by Roundheads, Jacobins, church-wardens, and restorers, we may see screens, altars, tombs, pulpits, thrones, lecterns, chantries, and shrines, as well as chairs, tables, and cabinets and chests, congruous with their monumental surroundings, but crowded with minute detail and enrichments and adjusted to the scale of a man.

In Plate VI. of this series we exhibited the architectural relations and significance of the chimney-piece and sideboard in a modern city dining-room. In further illustration of our subject, it has seemed desirable to present these opposite features in geometrical elevation and on a larger scale, so that we may indicate the degree of enrichment which they will admit without subordinating or confusing the main lines of the composition.

THE ILLUSTRATIONS.

COMPETITIVE DESIGN FOR A RECEIVING-VAULT, MT. PLEASANT CEMETERY, NEWARK, N.J. MESSRS. ROBERTS AND TAYLOR, ARCHITECTS.

DESIGNED to be erected of broken-range rock-faced Belleville stone; the bands, arch-stones, and other cut stone work to be of rubbed Belleville and Ohio stone. As shown on the plan and elevation the cost would be about $5,000. The design was remodelled and erected at a cost of $2,680.

DESIGN FOR A TOMB IN CUT GRANITE. MR. F. M. HOWE, ARCHITECT.

(2 Pemberton Square, Boston, Mass.)

ACANTHUS SPINOSUS. DRAWN BY MR. P. B. WIGHT, ARCHITECT.

See *American Architect*, p. 126.

CHURCH AT LARCHMONT, N.Y. MR. H. F. KILBURN, ARCHITECT.

(229 Broadway, New York, N.Y.)

SKETCH FOR A HOUSE AT STAMFORD, CONN. MR. W. RICHARD BRIGGS, ARCHITECT.

(Bridgeport, Conn.)

STUDIES OF INTERIOR DECORATION. PLATE VI.

See the article above.

CONNECTION OF THE WHITE SEA WITH THE BALTIC SEA. — The theory that the Baltic Sea on the west of Russia formerly communicated directly with the White Sea on the north is not supported by modern investigation. A fact tending to disprove it has been ascertained by M. Gobi, of the St. Petersburg Society of Naturalists, in studying the seaweeds of the Gulf of Finland, the eastern arm of the Baltic. He finds that these seaweeds are few in number and have migrated from the Atlantic Ocean, and that there is scarcely any likeness between the red seaweeds of the Gulf of Finland and those of the White Sea.

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CORRESPONDENCE.

THE ILLINOIS STATE-HOUSE IMBROGLIO. — BILLS TO PUNISH ARCHITECTS FOR RECKLESSNESS, TO COMPLETE THE LINCOLN MONUMENT, TO PROTECT GUESTS IN HOTELS, TO PUNISH BUILDING-COMMITTEES.

CHICAGO.

OUR new State House troubles have again come into prominent light through the appearance of the report of the Senate Investigating Committee. But very few facts not heretofore known have been revealed. It appears however, as a matter of history, that the building had hardly been commenced when in 1869 an investigating committee appointed by the Senate unanimously reported a resolution that the architect, Mr. Cochrane, and his assistant be immediately removed, on the ground that according to the best information attainable, the building which he had designed and estimated to cost $2,537,408, would cost not less than $5,000,000. He was not removed, however, and it is doubtful if he could have been on this pretext, for he had a written contract with the State. Another committee employed professional experts to make an estimate of the cost according to the plans, which very nearly accorded with that of Mr. Cochrane. The rest of this history has already been given in this correspondence.

The report of the Senate Committee just presented was generally thought to be very lenient toward the State House Commissioners, who were really responsible for the failure to complete the building within the constitutional limitation, and severe upon the architects, especially Mr. Piquenard, who is now dead. The following is the essential part of the Committee's report, as concerns the building and the architect: —

"Without going into the details of the copartnership which existed between John C. Cochrane and A. H. Piquenard, justice to the present commissioners demands the statement that for several years Mr. Cochrane has had but little to do with the building. Owing to the fact of Mr. Piquenard being dead, your committee feels a great delicacy in criticising his conduct, and would entirely refrain from any reference to him, did not justice to all concerned imperatively demand it. He was a man of genius and eminent ability in his profession; but he was a Frenchman, with expensive ideas and extravagant tastes, and made his plans and prosecuted his work on the State House with an utter disregard of expense.

"The larger portion of the expense of the building over the estimates has been caused, in the opinion of your committee, by the excessive and elaborate ornamentation, and by the many changes from the original plans adopted by Mr. Piquenard. In ornamentation the supreme-court room may be cited as an instance of expensive decoration — a room upon which a large sum of money has been worse than uselessly expended. The change of plans for the dome has involved another additional heavy expense of $295,388 57. A reference to the testimony submitted herewith will show many other changes with like expensive results. Your committee took a large amount of testimony in regard to the materials used, and the manner in which the building has been constructed, and finds the terra-cotta of which the balustrades and dome-windows are made, of poor quality, and, in the opinion of your committee, not durable. Throughout the building large quantities of Portland cement have been used as a substitute for stone, marble, or tiling, and it is proven and admitted to be of inferior quality, and will soon have to be replaced. The wood (or marquetry) flooring in the state department is a failure by reason of the shrinkage of the material, and will have to be removed and other flooring substituted. The scagliola, or imitation marble-work, in the main corridor hall of the house is also imperfectly made, and lacks durability, and will have to be replaced by something better and more substantial.

"The committee takes no pleasure in pointing out the defects, and only singles out the more prominent and obvious in the line of duty. Your committee finds among the incidental expenses attending the erection of the building, the following terms: Commissioners' salaries, $44,152.65; secretary's salary, $15,320; attorneys' fees, $5,200; the architects have been paid $83,000 as commissions.

"Your committee further believes that the retention of the present architect, by which he will be allowed additional commissions amounting to nearly $30,000, is wholly unjust to the people and unnecessary; that as the plans and specifications are now all complete, and the original contract with the architect expired, a competent person at a reasonable salary ought to be employed to superintend the completion of the building."

The report concludes as follows: —

"Your committee would further state, in justice to the State House commissioners, that while the evidence shows that they have made many mistakes, and have not fulfilled the pledges made in regard to the amount required to complete this work, yet they were not mechanics themselves, and had to depend entirely upon their architects for plans; and the evidence shows they were deceived and misled by the acting architect, upon whose judgment they relied.

"Your committee closes with the following recommendations: 1. A speedy enactment of a law to secure the four acres of ground south of the Capitol free of cost to the State, as promised by certain citizens of Springfield. 2. That the offices of State House commissioners and the secretary be abolished. 3. That John C. Cochrane be removed as architect. 5. That $15,000 be appropriated the Secretary of State for the purpose of enclosing the building from waste or damage. 5. That the report and testimony be printed, etc.

"MALDEN JONES, *Chairman.*
L. D. WHITING,
JEFFERSON RAINEY,
R. H. MCLELLAN,
H. I. FRANTZ."

Your correspondent had an opportunity during Mr. Piquenard's lifetime to make a careful examination of the building with him, and to freely discuss its defects. At that time it was anticipated that the extensive use of *carton-pierre* for interior ornamentation in place of stucco would at some time provoke charges of great extravagance. Its elaboration makes it a prominent thing in the eyes of superficial observers, yet the greatest excess of cost in this department cannot be figured at more than $50,000. The newspapers seem to take it for granted that this work is trashy and bad in every conceivable way, and therefore make a great ado about it; while in reality, with the exception of a few pieces which need to be replaced, it is a very substantial method of decorating where this sort of thing is wanted. Mr. Piquenard also had great faith in *scagliola*, and the first examples executed were remarkably deceptive imitations of marble, and, as *scagliola*, calculated to stand as long as any thing of the kind that has been made. But latterly he was led to try experiments with this material as applied to brick surfaces, and even to use the *carton-pierre* material as he had used the scagliola; and in this some lamentable failures were made, especially where it was used in the wainscots of the corridors.

In their plastic ornamentation and colored decoration, the supreme court-room and governor's apartments are sumptuous examples of the best French art decoration of the period; yet the recklessness with which such subjects are discussed is well illustrated by such sentences as these from an editorial in the Chicago *Tribune*. Speaking of the commissioners, it says, "They approved a system of ornamentation which was not merely in bad taste, and extravagant, but which the committee find to be defective and perishable. They report that of the supreme court-room to be worse than useless." They really did no such thing.

But in reality the report does injustice to these parties, lenient though it may be in its general terms, and this through a misapprehension of facts on the part of the committee. It pronounces the terra-cotta work of the balustrade and dome windows to be "of poor quality, and not durable." The facts are these: The contractor, Mr. Richardson, had stonework to do on the cornice, balustrade, and dormer windows (not "dome" windows), to the amount of $70,000. The designs were made for stone throughout. To save money, terra-cotta was substituted for stone in these parts, at an expense of less than $30,000; but the designs were not adapted to the new material. The crown member of the cornice was made with a groove *on the top* to receive the gutter lining; and the metal was forced into this, leaving a space for ice to collect, which would be likely to split off the outer edge. The honeysuckle ornaments of the crown member were not secured, and many were even blown off. Terra-cotta is a material which cannot be made solid like stone, but with a cell structure open at one side. The perforated parts of the balustrade were made in this manner, as they could be in no other according to the designs. The work was badly set, and the cells unskilfully filled with bad cement, which crumbled away, and allowed ice to enter the body of the work. It was this bungling workmanship in placing the work, combined with the illegitimate employment of this material, which have caused all the damage to it. Frost has done its own legitimate work, and will do more unless it is reset and repaired throughout. A mistake was really made in some of the material by the use of the wrong kind of clay for a part of it. This was, however, removed and made over, with the exception of a few pieces which were overlooked by those in charge at the building. When I saw the work, there was not an unsound piece observable, and the mistake in application was pointed out to the architect in charge, who readily appreciated the justice of the criticism.

The attempt to use Portland cement work made in position for one of the exterior stairways was an utterly inexcusable attempt to stretch out the funds in the last days of the work; and this cost $120,000.

But the committee have failed to detect the greatest defect anywhere to be found in the building; and this is the poor quality of stone used in the basement-story. This can never be improved or removed, and must forever remain an eyesore to every beholder and a permanent damage which no amount of work short of demolition can rectify.

The most remarkable part of this whole matter was the discovery, after the newspapers had pronounced the report to be an attempt to whitewash the committee, that after all the report was a compromise made to secure a unanimous report. An enterprising correspondent of the Chicago *Tribune* got hold of the original report framed by the majority and never presented, which condemned the conduct of the commissioners in unmeasured terms. The whole thing was published before any action was taken on the report actually made. It was very severe also upon the late Mr. Piquenard, and even accused him of allowing the moulds paid for by the State, to be taken away to be used in the Indianapolis City Hall.

There seems to be no doubt now that the recommendations of the committee will be adopted in the form of a bill, before the bill authorizing a popular vote upon a further appropriation to complete the building is passed.

Besides the State House matter our Legislature has had in hand many others of interest to the architectural profession. The Senate has passed a bill to punish architects and builders for recklessness and incompetence. It provides that when loss of life or property occurs through negligence of an architect, mason, carpenter, or other person employed to plan or erect a building, the punishment shall be imprisonment in the penitentiary not less

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than one nor more than ten years, or fine not exceeding a thousand dollars, or both.

The House bill appropriating $27,000 to complete the Lincoln monument at Oak Ridge Cemetery near Springfield has been passed.

A bill has also been passed in the House providing for the safety of guests in hotels. It will doubtless go through the Senate. It provides that the proprietors of all hotels now constructed or hereafter to be constructed in this State, of more than two stories high, shall within thirty days after this act takes effect procure and place in each room of said hotel, above the second story, a wire-rope ladder sufficiently strong to sustain a weight of five hundred pounds, and long enough to reach from the window in such room to the ground, and shall within the thirty days aforesaid cause to be placed in each of such rooms safe and sufficient bolts or rings to which such ladders shall be kept attached.

Any person violating the provisions of this act shall be liable to indictment, and on conviction shall be fined in any sum not less than five hundred dollars, and by imprisonment in the county jail not less than one year."

Still another bill has passed the House, which is directed against building-committees. It is probably the first law ever proposed to meet the case of this class of malefactors.

The bill provides that whenever the General Assembly shall pass any enactment "for the construction or repair of any public work or improvement of the State of any character or name whatsoever, and the said enactment shall have become a law, and plans, specifications, and estimates for the construction or repair of said public work or improvement have been submitted to and approved by the authorities designated in said law, and an appropriation has been made to defray the estimated expense thereof; any person or persons, commissioner or commissioners, or other officer or officers, intrusted with the execution of said public work or improvement, who shall so change, alter, or modify, or permit or connive at such change, alteration, or modification by any person or persons under his or their direction or control, directly or indirectly, so as to incur a greater cost and expense in the construction or repair of such public work or improvement than was specified by the law authorizing it and the appropriation made in pursuance thereof, shall be deemed guilty of a misdemeanor, and upon conviction thereof in the manner hereinafter provided shall be fined in a sum not more than five hundred dollars, or by imprisonment in the county jail for a term not more than twelve months, or by both fine and imprisonment within the limits specified in this section, at the discretion of the court before which he or they may be tried." All that is needed after this is a bill to punish committee-men for impositions upon confiding architects, and to punish architects for putting too much confidence in building-committees.

OUR WORKMEN.

IT may be ranked, I think, among the truisms of our present architectural era, that our workmen do not come up to a standard which would render them capable of executing works thoroughly sound in construction and thoroughly beautiful in ornament. Few architects there are, I am sure, but find that, spite of the clearness of the most definite details, and in the face of the most minute instructions, their ideas are rarely carried out in execution as they intended they should be, and that even the closest surveillance of every part will not always bring matters to a satisfactory termination. Either there will be some flue neglected at the place of all others where it should be most carefully attended to, near or in connection with woodwork; or some sappy joist put in; or some bad and unsightly brickwork done, — all of which will show in time, and cause ceaseless blame and disrepute to fall upon the head of the unhappy architect, who could have been in no wise held responsible for every little item, for the position of every brick, or the rightful cutting of every stone, and whose drawings and instructions were disobeyed and slighted either through wilfulness or stupidity.

From this state of affairs it becomes us to rid ourselves as soon as may be; and if our condition can be bettered by our saying or doing any thing, let us by all means take heed to our words and actions.

We must first inquire in what it is our workmen are deficient, or what they possess hurtful to building in general, and after that we must strive to find some means by which the true balance may be restored.

Trades-unions, while they serve oftentimes, no doubt, a very useful purpose, have also served as great blocks and hinderances in the way of material progress. The readers of this article are more or less familiar with the miserable working of one of them, — the Society of Bricklayers, — in the case of the Messrs. Doulton of England; and I need only say here that the trouble arose out of the employment of a superior class of hands to those the Bricklayers' Union was able to supply. These societies, organized in the middle ages originally for the protection of special industries and the prevention of deterioration, are becoming aggressive; they are using their utmost exertions to prevent the employment of labor skilled above their own, and thereby are sapping the foundation on which all increase in the beauty and usefulness of the arts rests. True, this is a case somewhat foreign to us as Americans; but there seems to be a tendency even here to this sort of exclusiveness, and it is our duty to repress it if possible.

The primary cause that brought about this trouble was not, in reality, such as was given; but it was the failure on the part of the unionists employed, to reason upon what they were doing. The faculty of ratiocination had been so thoroughly kept under or misused, that when opportunity for its right employment arose, and when such employment might have proved of vast benefit, not only to those concerned, but to the whole world, it was not forthcoming; thought and foresight were below par, disappointment and anger above it.

The instillation then of some hints on reasoning would be a first great object in undertaking artistic missionary work among our tradespeople and mechanics (of course I only speak now of those who have to be dealt with in building): a slight amount of reasoning would frequently suffice to solve a problem now a *bête noir* to many a carpenter; and the same slight amount added to a little thought and study would furnish not only many a charming detail to our buildings, but would make them more constructively excellent. One great evil that we have at present to encounter is lack of knowledge on the subject of any specialty. It is not to the interest of good building, — and architecture can never attain its highest position in such a state, — that workmen should have to be continually watched, that assurance may be had of their doing correctly those works which lie strictly within their province; and yet as it is now we never feel quite certain that all is progressing as it should unless we view it. I know not how the supremacy established by the Church of Rome during the mediæval ages would operate in this age, with all the progress that has since been made in almost every branch of industry; but then it certainly worked very favorably for architectural structure and beauty. Then there seems to have been no hurry, and the workman's ambition was a correct and noble one, that each one's special work should be accomplished properly; if their minds were coerced in one way by the strong bands and chains thrown around their spiritual workings, they were yet left free to expand in a direction which produced monuments to the eternal fame of the possessors of such minds. Whether all this knowledge and adroitness was the outcome of a system of freemasonry, and the result of a continual interchange among the different nations of opinions and ways of working, I leave to others better versed than I am to decide; but this we know certainly, that the generality of the work then was almost infinitely superior to the generality of work now. The commonest workman then, if left to himself, was never at his wits' end to know what to do; and it was thus because of his knowledge of his special duty and what he could accomplish.

There have been causes for a decline of this sort, and our workmen are not altogether to blame. Some changes caused a decrease of thought, a decrease of interest, and with them a decrease of knowledge; for the more interested we are in a subject, the more knowledge we will be likely to gain of it. Our many inventions have paralyzed invention, if I may write in the Irish fashion of speech, and produce an apparent anomaly. While the projector of some new improvement in the saw-mill and turning-lathe was working quietly in his closet, the carpenter was becoming demoralized by what in that line had already been accomplished: when he could go and buy ornaments by the hundred, there was no longer any need for him to spend his time in evolving something by no means as mechanically perfect; there no longer existed the need for many things to be made by hand, for the machine made them quite as well or even better. But the interest was lost; he became discouraged, and his work degenerated into a drudgery; and from the wish to be famous for his skill and goodness of work, the mechanic has become more desirous to be renowned for its costliness and quickness. So the decrease of knowledge followed; but the demand for it is still great and should not be overlooked.

It is entirely unknown to me whether young workmen of the mediæval times, — which times constitute an era renowned for its buildings alike perfect in construction and ornamentation, — whether they took pleasure in learning their special trades, or whether they rather shirked such study as a disagreeable duty. I am inclined to think however that such great projects could not have been successfully carried through, had not the workmen of those days learned well their business in early life. Most of our faults of construction can be laid either at the door of lack of sufficient knowledge or carelessness. Carelessness is to some degree engendered by ignorance, but it is not always; still in any case it is one of the vices in our present system of work that most constantly meet us. I was much struck with this some time ago, as I watched two apprentices laying brick in a chimney-breast. These boys (for they were little more), who I suppose in a year or so will consider themselves capable of undertaking *any* work, were busy discussing some absorbing topic, — I believe a party of the night previous, — every other idea having flown; the work meantime progressing mechanically, and the result being that in four or five courses one side was a course higher than the other.

I suppose we should not complain, in this our democratic country, of an equality between the architect and those who have to work for him: every stone-breaker that votes has a position equal by

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law to that of the most intellectual man of the Union. It is all right, no doubt, but it works somewhat badly for architecture; for without a united set of ideas, such as springs from the head of the architect, being carried out, what hope is there of success? and they never can be carried out profitably without subordination. It is a very rare sight indeed — that of workmen and tradespeople acknowledging the superiority of the architect: in fact, they are often not even civil to him; they think that their opinions are worth as much or more than his, and his wishes are not always consulted before changes are made. Of course, every professional architect should be willing to hear the views, and abide by them if correct, of the entirely practical man; but no workman has a right to force his opinions upon an architect, nor, if he decide differently, to scandalize him, for how does he know what may cause the difference of opinion? The growth in this country of a set of architects from tradespeople has no doubt favored this, — we are all indeed somewhat to blame for our incompetency, — but the mere position of architect should be sufficient to command respect, and prevent any such babbling as I heard once from a tradesman, who made a rule of speaking disparagingly of each architect in the city except the one whose office he was then in. Probably, classing architects as on a par with himself, he thought this was a sure way of procuring custom; but I trust he was mistaken.

I am sorry to be compelled to say that for conceit, — which once showed itself very plainly in the case of a bricklayer who, never having understood a drawing, attempted to build a house not altogether a square box with openings, — ill manners, and too often dishonesty, our work-people are difficult to equal. Of course many cases will arise in all our minds where this is not so, indeed, where the very reverse has obtained, where kind, respectful behavior goes hand in hand with good work; but in ten cases to one it is otherwise.

In regard to the remedies for these great disorders, I think that the architects should not only be the physicians, but to some extent the almoners of drugs to the infected. The public at large are coming annually, and will annually be brought more, as knowledge and culture increase, to appreciate the true duty and business of an architect, and we can afford to leave them alone; but our duty to our workmen might be best accomplished if we could first set a good example not only of due attention to our special business, so that laughs and jeers at the architect's lack of practicality should be less frequent, but in our lives and habits; and secondly, by lecturing or writing, if we are able, or in some other way instil a knowledge of materials and their proper uses, of ornament and its proper place, into their minds. As a gain was made in knowledge, no doubt some, or an equal one, would be made in care.

I do not think these projects are altogether Utopian. Our workmen would, if called together, very likely take kindly to an entertaining and instructive lecture. It might be a task harder of accomplishment in this free age of liberty, — when clergymen are not even exempt from having their names banded round for party watchwords as "Jones" or "Brown," — to bring them to understand the superiority of the architect's position to theirs; the superiority of educated mind to muscle; the superiority, taking an illustration in matter, of the power of the lever to the fulcrum; to get them to comprehend that inferiority means not servility or cringing, but that inferiority of one portion of mankind to another is a general law of sociology which cannot be transgressed with impunity; that, while the architect is placed over them by education and position, he is in no wise superior to them as a mere man: this might be, I say, a difficult undertaking, but it is possible of accomplishment, and our energies should certainly be directed towards it.

T. BUCKLER GHEQUIERE.

APPENDIX

TO ARTICLE ENTITLED "ARCHITECT AND CLIENT," AMERICAN ARCHITECT NO. 35, AUG. 16, 1876.

"With this advantage then
To union, and firm faith, and firm accord."
Paradise Lost, Book II., 35, 36.

I HAVE referred in the foregoing article, to the practice that obtains in England in many important differences from our less firmly established professional customs; and I take the subject again in hand in order to make further comparisons from which we may learn by the light of English experience, who have learned to subdivide the various labor incident to an undertaking so as to insure as far as possible the efficient execution of the work. I have discussed the preliminary intercourse of architect and client, and their relation during the progress of the work; but I have not touched upon an important phase of preparation in which both are directly involved, viz., the best means of arriving at an intelligent estimate of the cost to base a contract upon. While it may be truly said that a competent architect should be able to analyze a builder's estimate, and have a well-founded opinion as to the necessary outlay, such a desideratum does not preclude the builder's having a totally different conception of the work and materials represented by his figures. For few builders understand the science of quantities, and arrive at their conclusions in most instances by comparative guessing, and pretty bold guessing at that; consequently, however explicit the drawings and specifications may be, the builder often finds that he has under-estimated the quantity of this or that, and an incentive to conjure up extras arises. At this point the client's interest is obvious, and the architect must protect him as well as his own reputation for practical foresight; every possible ambiguity in drawing or specification is argued on the builder's side, and often, if the amount at stake is worth the trouble, law is resorted to; the builder wins his case of course; and however blameless the architect may be, it would be difficult to persuade the average client that he has not shown some carelessness, incompetency, or worse.

This sort of complication rarely occurs in England, owing to the practice of employing quantity surveyors, whose duty consists in preparing exhaustive bills of quantity from the architect's drawings, setting forth in unmistakable terms, and where necessary with marginal illustrations, exactly the amount of each and every description of work mentioned or shown on drawings or in specification. These bills of quantity are drawn up with a blank column for figures opposite the various items, and the tendering builder fills in the prices at which he is willing to perform the work. The responsibility of accuracy rests with the surveyor, and can readily be traced when any claim for extras is made, and any question can be settled beyond dispute without recourse to law, each item being accompanied by the price at which the builder contracted to execute it. The advantages of this custom are too obvious to require discussion, in comparison with our own loose practices. There are however some minor points upon which a word may be said. I believe that it is customary in England for the selected tender to pay for the quantities; and I think in this particular an improvement could be made. I think that for many obvious reasons the architect should be responsible for the quantities, and that they should be considered as part and parcel of the tools that he prepares for carrying out the work. Of course he would be obliged to charge his client for them, but the client pays for them in any case; so that the effect of this amendment is to centralize authority and responsibility, a tendency that I think no competent architect would complain of.

It seems that the making a quantity surveyor an independent concern was adopted with the idea of making some one primarily responsible for inaccuracies in the quantities; but this very point is in favor of my suggestion, because the discrepancy could be deducted from an architect's fees with justice, while the dread of such a penalty would induce care, and also give him a sounder commercial reason to base his fees upon which the most practical client must respect.

A. F. OAKEY.

PLUMBERS' TRAPS.

BOSTON, May 16, 1877.

A WEEK or two ago inquiry was made about the plumbing traps used here.

Besides the ordinary S trap, the Boston plumbers use the D trap, which consists of a trough of sheet lead soldered together in the shape of a D lying on its back thus, ⊃. The outlet-pipe penetrates the bottom near one end; and the inlet-pipe passes through the flat top, the mouth of the inlet being an inch or so lower than the mouth of the outlet-pipe, giving thus a water-seal of a depth equal to the difference in level of the mouths of the two pipes.

The trap-screw is in the flat top. Instead of the D trap, many of the best plumbers use the "box" or "bottle" trap, which consists of a cylindrical box of sheet lead, about the shape and size of a dinner-pail, with flat bottom, and the top somewhat contracted like a truncated bottle. The mouth of the bottle is occupied by the brass trap-screw, the inlet-pipe entering at one side, and the outlet-pipe being let in through the bottom, as in the D trap.

The box-trap has the advantage of admitting a larger trap-screw than any other.

Besides these traps, which the plumbers make out of sheet lead for their own use, there is a cast-lead trap, — Adee's patent, — consisting in substance of two shells like the upper and lower shell of an English walnut. The inlet-pipe is fixed in the upper shell, and the outlet-pipe in the lower, so that when the two shells are soldered together there will be a difference of level in the mouths of the two pipes of one inch, and a water-seal therefore of the same amount.

All these traps are proof against siphoning out, apparently for the reason that when a vacuum is formed in the outlet-pipe, the air coming through the inlet to take its place acts only on a small part of the surface of the water in the trap, and pushing the water aside instead of driving it before it, bubbles through, displacing at most only a spoonful or so of the trapping water.

T. M. C.

FIRE-PROOFING WOODEN BUILDINGS.

THE value of Messrs. Evans and Swain's method of fire-proof building, whereby a return to timber construction under certain conditions is advocated, was practically tested last week. In furtherance of the test, the inventors had a structure run up in 14 inch brickwork on the vacant ground on the Thames Embankment, near Blackfriars Bridge, and on which was laid a test floor on their

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principle. The test floor measured 14 feet by 14 feet in the clear, and was composed of battens or joists 7 inches deep by 2½ inches thick, spiked together. The floor was here formed by the top edges of the battens, but floor boards can be laid where desired. The interior of the brick structure carrying the flooring was seven feet high from ground to ceiling, and it had an arched entrance four feet wide on one side, and four nine-inch by six-inch air gratings in two other sides for draught. One-third of the floor was left plain underneath; a second third was plastered, the key being formed by dove-tail grooves in the wood; while the remaining third was plastered, the key here being formed by nails half driven. The cracks between the joists were grouted with fine plaster. After standing for about ten days, subject to the recent changeable weather, and the work being still green, the floor was put to test. On one day during the week, four loads of timber were heaped in the structure, and set on fire at ten o'clock. In a very short time there was a fierce furnace blazing in the building, which for a long time had no perceptible effect on the floor, which externally remained cool. At 12.35, however, smoke and flame began to issue through the joints of that portion of the floor which was unprotected by a plaster ceiling, and by one o'clock there were signs of leakage of steam and smoke in other parts. A little earth was strewn on these joints, which no doubt were defective through having been badly grouted. By 1.30 the wall showed a considerable bulge at the side where the flooring was unprotected, and the fire crept up between the brickwork and the flooring. By three o'clock, after five hours' trial, the fire had fairly got hold of the unprotected flooring, and a portion of it fell in. It was, of course, useless to expect that the remainder of the woodwork could stand, as the flames ate into it sideways, bringing down batten after batten. About 3.30 a fire-engine arrived, and after about an hour's work the fire was got under. The only portion of the floor left was that third to which the plaster was attached by nails and three battens of the dovetailed portion. This remnant of flooring was about six feet wide, and, as soon as the fire was got under, it was loaded in the centre with about a ton and a half of granite pitching stones, which weight it bore, as well as that of two men who were loading the same on. The base of the pile of stones was four feet square, and the load was subsequently increased to three and a half tons, under which weight the flooring gave way. It was then ascertained that the under side of the flooring was charred through for a depth of about four inches, leaving three inches of sound timber.

To test and compare the action of the fire on iron and wood, an ordinary seven-inch rolled iron joist had been placed on supports inside the building directly over the fire and within a foot of the ceiling, a weight of about three hundred weight being placed on its centre. After being exposed for about one hour in the flames the iron joist became bent and twisted, and finally toppled over into the fire in a crippled condition. It will thus be seen that the timber flooring was exposed to such an intense heat and under such conditions as it is hardly possible to imagine could occur at an ordinary fire. In the event of a fire breaking out in any building, in no case would a floor or ceiling be subjected for five or six hours, or even for one hour, to the action of such flames as played upon the experimental floor in question, without any attempt being made to subdue them. It is to be observed, moreover, that these results were obtained with a floor of the lightest form, that designed for ordinary rooms, and yet a good margin of safety remained. For public buildings and warehouses, the thickness would be ten inches or even eleven inches, thus greatly increasing the strength and adding to the security. Considering the intensity of the heat developed, the proximity of the fire to the woodwork, and several imperfections in the brickwork, the flooring may be said to have stood its ground exceedingly well. — *Iron.*

NOTES AND CLIPPINGS.

GOVERNMENT CONTRACTS. — Attorney-General Devens has recently made the decision that contracts between the Government and parties in charge of the erection of public buildings are illegal and void because they extend over a term of years, whereas appropriations are made for one year only, and the law prohibits making contracts binding on the Government to pay for services for which there is no appropriation. This work is done under the direction of the Treasury Department, and Mr. Sherman has appointed Assistant Secretary French, Supervising Architect Hill, and Col. Casey of the Engineer Corps, a commission to examine into the matter and report a legal way of preventing the difficulties which must arise under a strict construction of the decision of the Attorney-General. The works for which contracts are made for years in advance and which may be affected by this opinion, and the parties who have contracts, are as follows: Cincinnati Custom House, Bodwell Granite Company, granite and cutting; Chicago Post Office, John M. Mullen, cutting on dimension stone, nearly completed; Hartford Post Office, Mark and St. John, cut granite; Philadelphia Post Office, C. D. Dixon, cut granite for superstructure; St. Louis Custom House, Hurricane Island Granite Company, cut granite for superstructure.

A HINT TO INSURANCE AGENTS. — The *Builder* says that "It is, or ought to be, a fact well known to insurance-agents, that the death-rate is much higher amongst those who sit under the gallery than amongst those who sit in the body of the church."

PROTECTION FOR ILLINOIS HOTELS. — The new bill now before the Illinois Legislature — which was prepared in part by Jewett Wilcox of the Tremont House, and Harry G. Pulling of the Commercial Hotel, who were sent as a committee to Springfield by the Chicago Hotel-Keepers' Association — provides that, —

"The owner or owners of all hotels now constructed in this State of more than two stories high shall within thirty days after this act takes effect, and the owner or owners of all hotels hereafter erected in this State of more than two stories in height shall within thirty days after the completion thereof, procure and place at the end of each hall above the first story, and accessible from each floor, a stationary iron ladder of sufficient strength to sustain a weight of not less than fifteen hundred pounds, and a sufficient width to admit of the free passage of persons passing each other up and down said ladder, and to reach to the top of the first story from above; or such other means of fire-escape to be permanently attached to such hotels as shall be approved of by the City Council of the cities, or Board of Trustees of the towns or villages in this State, in which said hotels are located. And in addition, such owner or owners shall place at the head of each stairway and at the end of each hall, where such ladder or fire-escape are placed in such hotels, a red light, so as to indicate the location of each stairway and ladder or fire-escape in such hotels."

The penalties provided for infringement of the law are a fine of not less than five hundred dollars nor more than two thousand dollars, or imprisonment in the county jail not less than one year, or both, at the discretion of the Court. If the hotel keepers or proprietors neglect to comply with the law, and the guests are in any way damaged by reason of such negligence, the keepers or proprietors are held responsible for such damage or injury. In case of any one being killed as a result of such neglect, then the hotel keepers and proprietors are held responsible to the relations of the deceased in a sum not exceeding five thousand dollars. There are also other stringent provisions, which authorize authorities of towns, cities, and villages to put up such fire-escapes wherever the proprietors refuse to do so, and the latter are held responsible for double the amount of the cost. Further than that, if they in any way obstruct the authorities, they are liable to a fine of not less than fifty dollars and up to two hundred dollars, which may be recovered before any justice of the peace. This law, though stringent, is favored by Chicago hotel proprietors, nearly all of whom have already in part provided what it calls for, except the red lights, which several proprietors propose to put in whether the bill becomes a law or not.

THE GREAT ORGAN FOR CINCINNATI. — The contract for the construction of the great organ for the Cincinnati Music Hall has been awarded to Messrs. Hook and Hastings of Boston. When completed according to the plan and specifications which form the basis of the contract it will rank among the largest organs of the world, the only larger ones being those at the Albert Music Hall, London; the Cathedral at Ulm, Germany; the Church of St. Sulpice, Paris; and St. George's Hall, Liverpool. It will have four manuals and a pedal of two and one-half octaves, the compass of the manuals running from C^0 to C^4, 61 notes, and of the pedals, from C^1 to E^1, 30 notes. Following is a summary of the stops and pipes: —

	Stops.	*Pipes.*
Great organ	22	2,234
Swell organ	19	1,708
Choir organ	17	1,281
Solo organ	6	366
Pedal organ	16	600
Mechanical registers	14	—

Totals — Stops, 94; pipes, 6,189; and 12 pedal movements.

The contract made is for the organ only, and does not include the case. The total cost of the organ will be about $30,000, of which Messrs. Hook and Hastings are to receive under their contract from $26,000 to $27,000. About $16,000 have already been subscribed towards the organ fund. The contract calls for the completion of the organ by the 15th of May, 1878.

BLACKWELL'S ISLAND BRIDGE. — The plans of the Blackwell's Island Bridge are being revised with the expectation of reducing the estimated cost by about $200,000.

DESTROYED BY A HURRICANE. — A brick church nine miles north of Marion, Ind., was demolished by the storm of the 20th inst. At the time it was filled with people attending divine service. The roof was uplifted, and the walls fell in, burying the inmates. One young man was killed, and ten or fifteen seriously injured.

THE NEW YORK POST OFFICE. — It is reported that Secretary Sherman has decided to send a commission consisting of three officers of the United States Engineer corps to make a thorough inspection of the Post Office and United States courts, and report at once and in full as to the safety of the entire building.

EARTHQUAKES. — Dr. Fuchs, in the *Mineralogische Mittheilungen*, gives detailed statistics for 1875 of earthquakes throughout the world. The number of shocks recorded is 97. The greatest number were in January; next greatest in December and March; the least were in October and September. The number of lives lost by earthquakes was 20,000. The most destructive of these occurrences were the earthquakes of Cucuta, New Grenada, May 16-18, which destroyed several towns and villages, and of St. Christobal and Guadalaxara, Mexico, Feb. 11, which extended from the Pacific Ocean to Leon. Of volcanic eruptions those which took place in Iceland were the most important.

THE INCREASING USE OF THE DIAMOND DRILL. — The American Diamond Rock Boring Company have recently bored several holes 12 inches in diameter, some of them to the depth of 60 feet, for hydraulic elevators which are being erected at Hartford, Conn.

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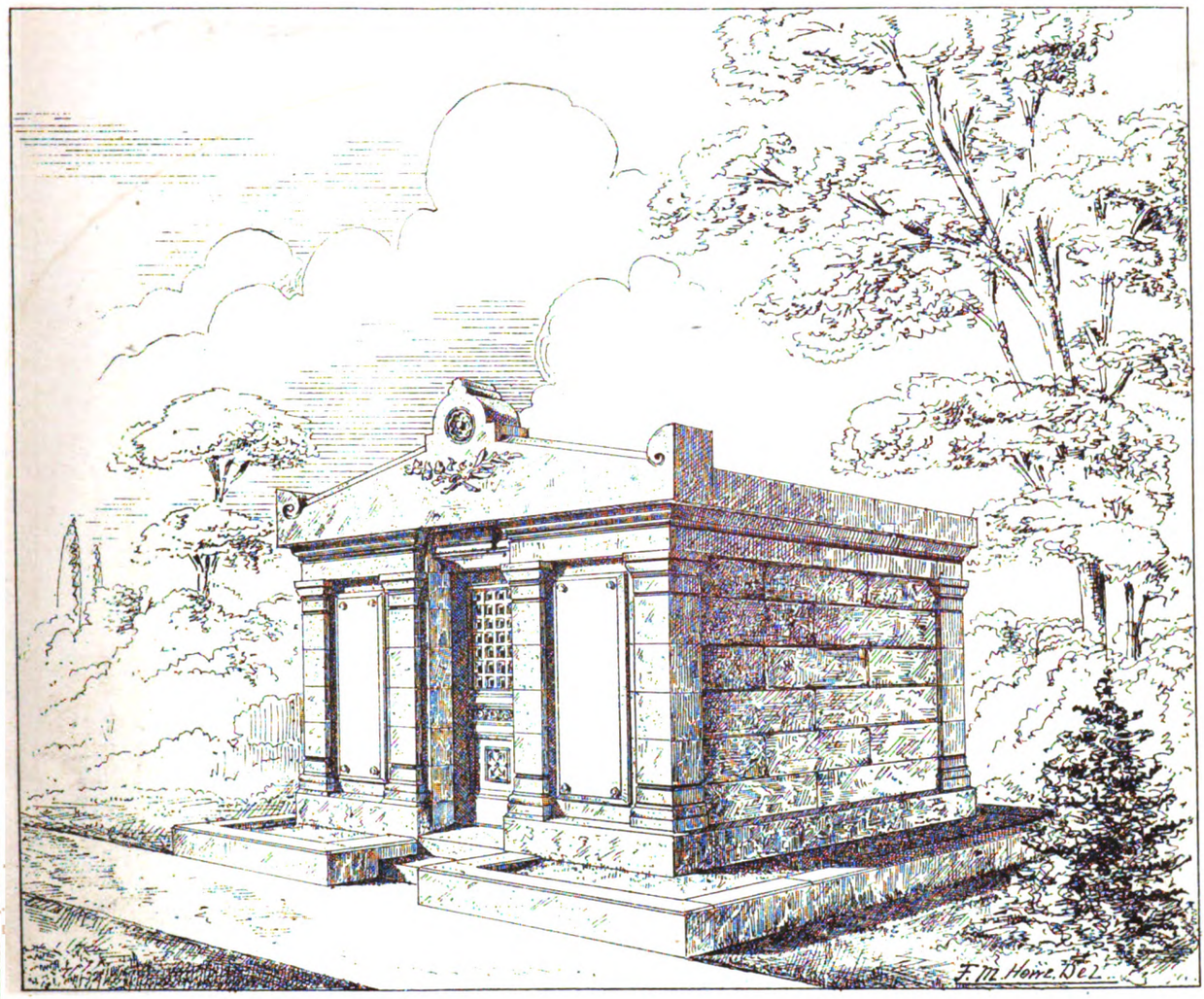
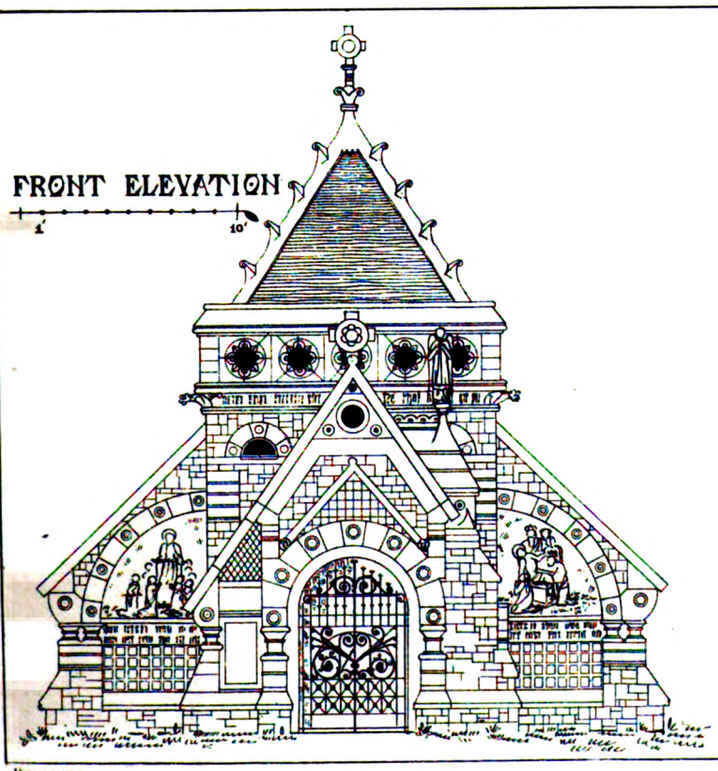
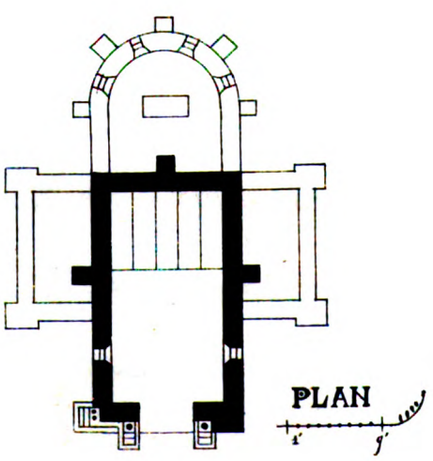


DESIGN FOR A TOMB IN CUT GRANITE. F. M. HOWE, ARCHT. BOSTON.





HELIOTYPE JAMES R. OSGOOD & CO. BOSTON

RECEIVING VAULT, MT. PLEASANT CEMETERY
ROBERTS & TAYLOR, ARCHITECTS.

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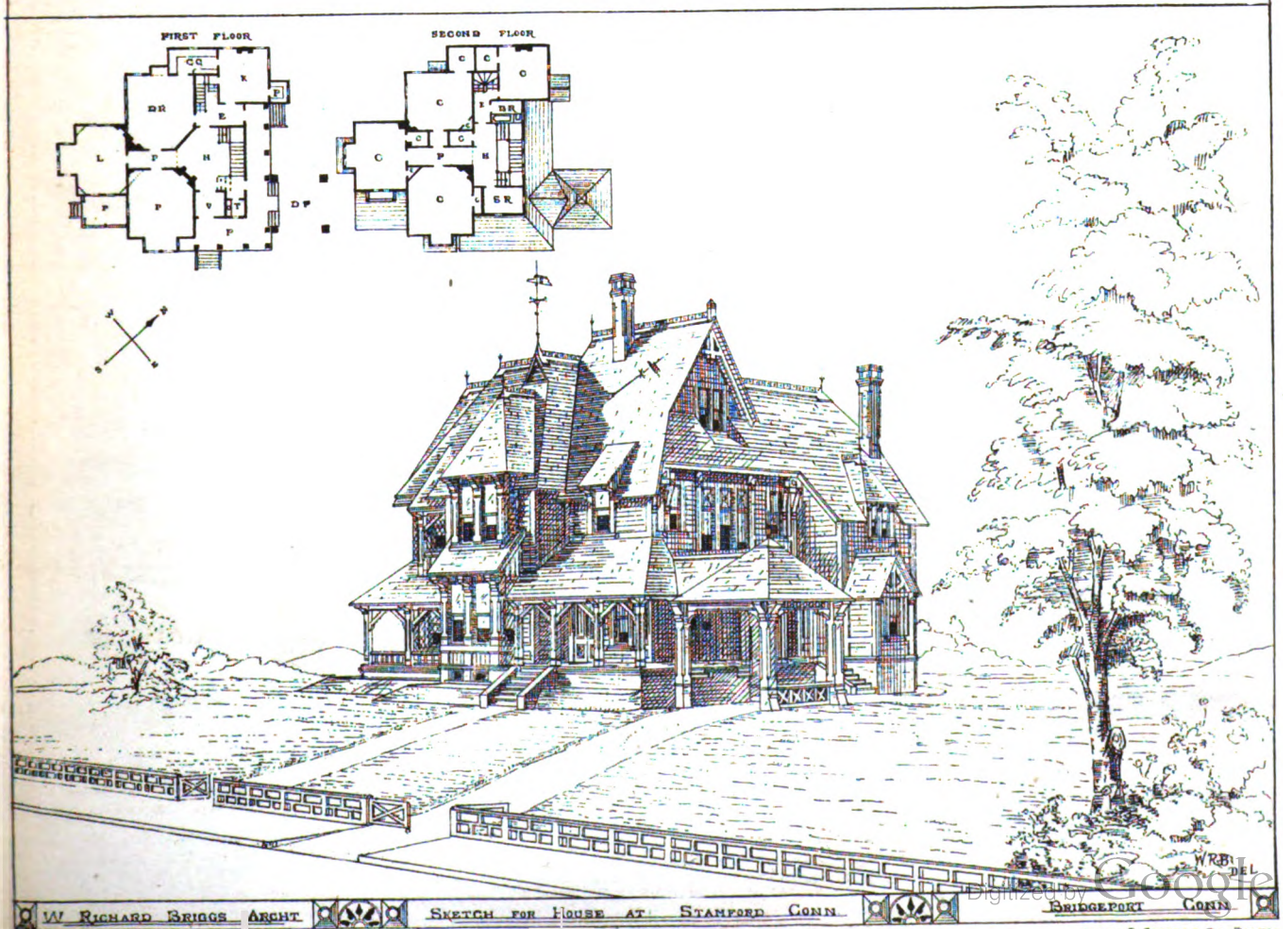
DESIGN FOR CHURCH, AT LARCHMONT, N.Y.
HENRY F. KILBURN, ARCHITECT.



W. RICHARD BRIGGS ARCHT. SKETCH FOR HOUSE AT STAMFORD CONN. BRIDGEPORT CONN.

W.R.B. DEL

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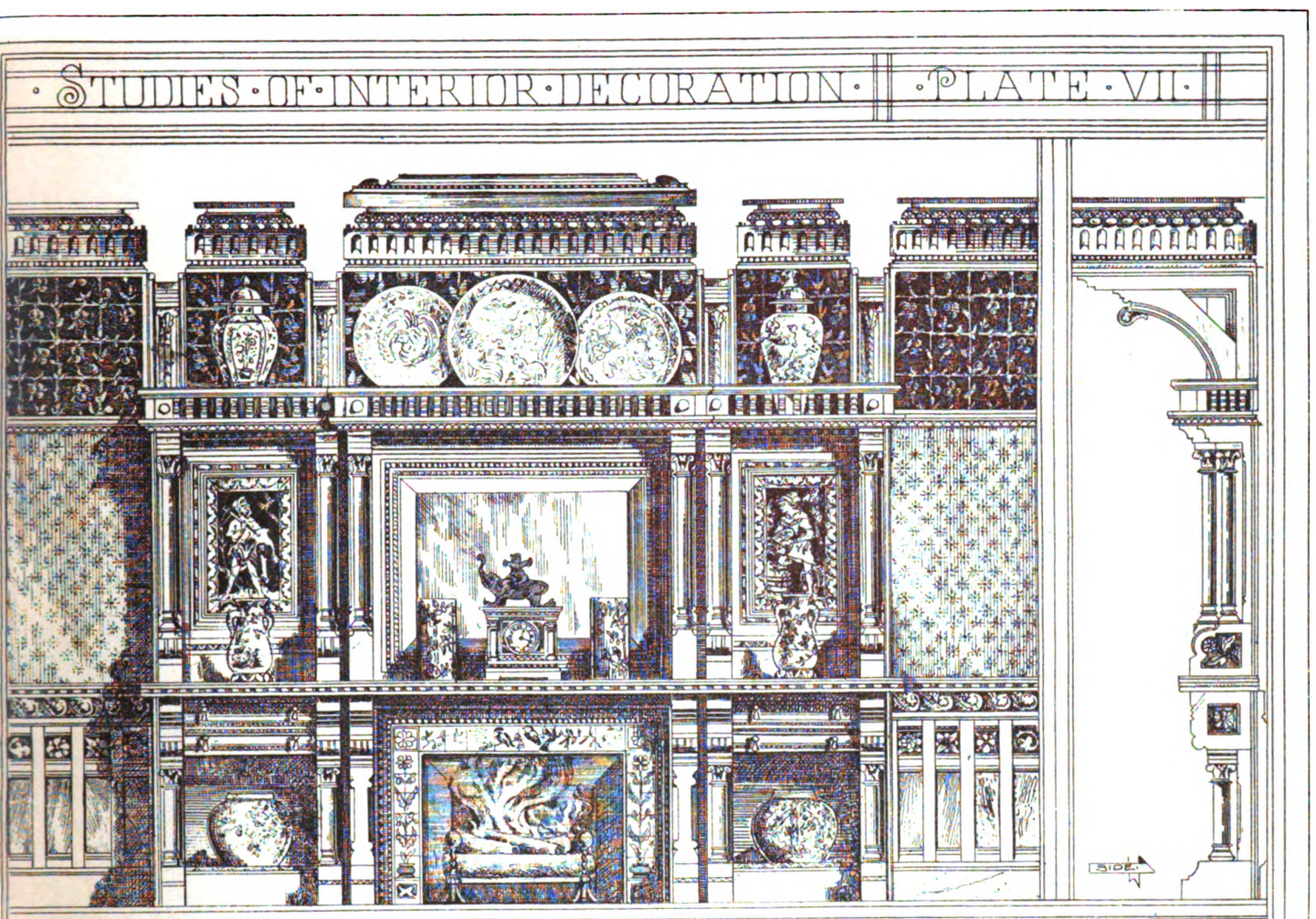
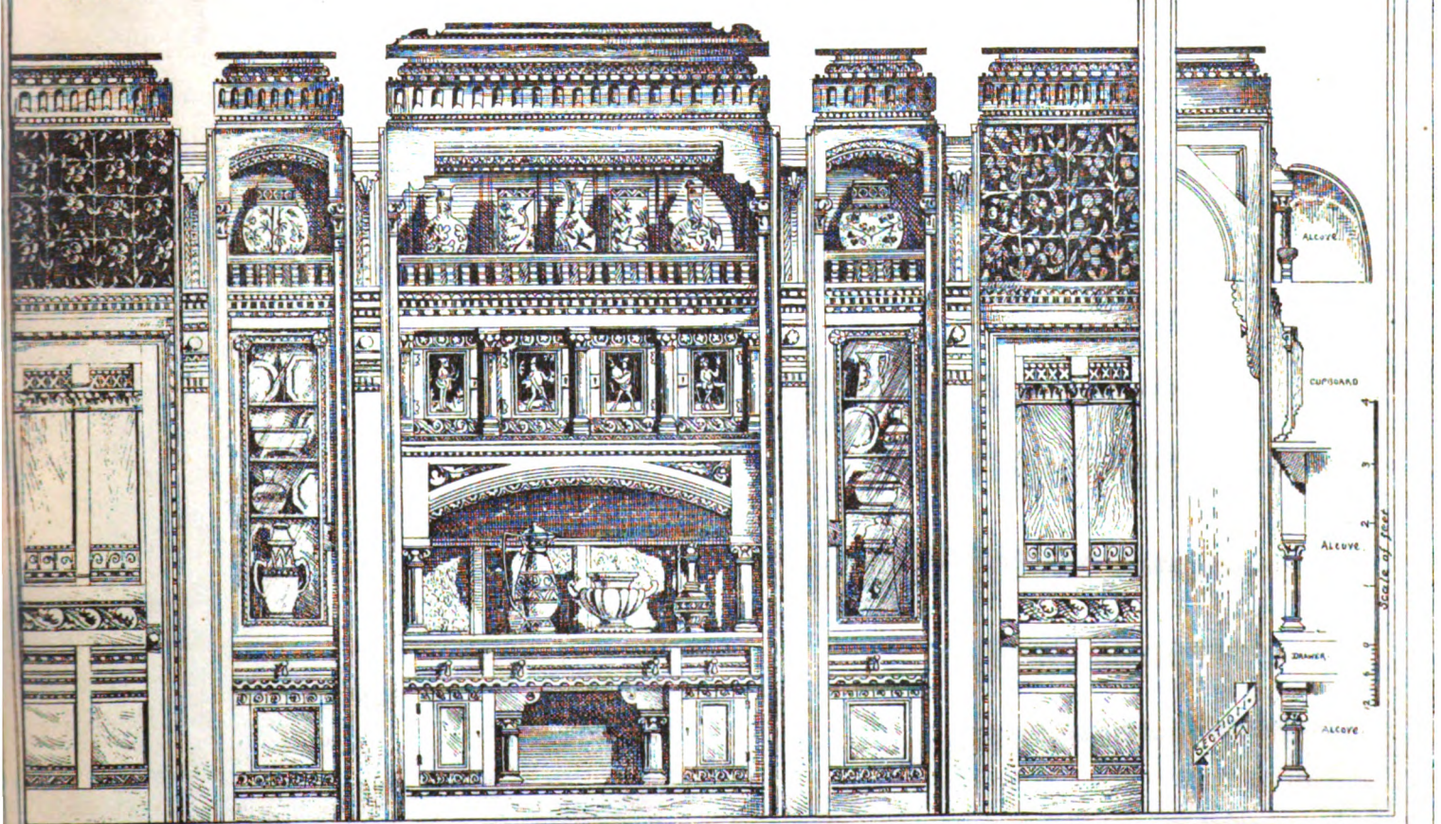
STUDIES OF INTERIOR DECORATION. PLATE VII.



DETAILS OF DINING ROOM. PLATE VI. CHIMNEY PIECE.

E. Burns, del.



DETAILS OF DINING ROOM. PLATE VI. SIDEBOARD & BUFFET. HENRY VAN BRUNT. INV.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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WE give in another column the report of the special commission of experts summoned to assist in the examination of the coroner's jury on the fall of the Rockford Court House, and the essential part of the coroner's verdict rendered thereupon. The main points of the examination recorded in the report have been anticipated, that the piers provided in the plans for the support of the iron columns were too small for security, but that if they had been exactly according to the plans and specifications they would probably not have given way as they did; that they were built smaller than the plans required (by more than a fourth, the report says), of inferior brick badly laid in inferior mortar; and that these facts might have been discovered and the ruin of the building averted by a careful inspection at any time before the superstructure was set on the columns. The contract to which the experts refer, that between the board of supervisors and the builder, assigned the control of the building and the appointment of the superintendent to the architect, while by it the contractor assumed all the risks of any kind incident to the work. About the contract or agreement between the board and the architect, whereby the oversight of the building was taken out of the hands of the architect, who was only to be called on for occasional consultation or explanation, while a superintendent, who was one of themselves, was appointed by the board,—about this the report says nothing, because the commission were not consulted about it; but it condemns the appointment of the superintendent as an example of bad practice. It declares finally that the architect failed to make sufficient calculation of the strength of his brickwork; that the superintendent is responsible for the existence of the defects in it, which were in view for many months; that the contractor is responsible for bad material and workmanship, and that under his contract no failure of either architect or superintendent relieves him of responsibility.

A BILL which has been brought before the Illinois Legislature shows that the innkeepers of that State have shrewdly resolved to take the bull by the horns, and if possible forestall the imposition of unwelcome restraints upon them. It is fathered by the Chicago Hotel Keepers' Association, and orders that the owners of every hotel of more than two stories high shall place "at the end of each hall above the first story, and accessible from each floor, a stationary iron ladder of sufficient strength to sustain a weight of not less than fifteen hundred pounds," or some other permanent fire escape, which shall be approved by town authorities, and must set a red light to show where it is. But that the first provision is so trifling as not to be worth disobeying, it might be a question how wide a door for evasion was opened by the alternative so vaguely set forth. These easy restrictions are buttressed by formidable penalties of fine and imprisonment; and the penal clauses are drawn with an air of relentless severity, which, considering the inoffensive character of the order they support, is diverting. The ladder device is here much less oppressive than the wire ladders provided for in the previous bill of which we have spoken, but is, like them, a ridiculous pretence as a substitute for the right kind of control over the building of hotels. We should be sorry to see such a ladder attacked by an excited crowd struggling to escape. It remains to see how much of such dust the Illinois Legislature will allow to be thrown in its eyes.

THE following letter has been sent to a number of architects in Boston; and since we know no reason why the architects of that city should be singled out for such favors, we may assume that it has been distributed elsewhere.

[Private.]

INDIANAPOLIS, IND., May 22, 1877.

MY DEAR SIR,—Our late Legislature passed an Act to provide for the building of a new State House. The Governor has just appointed the commissioners. If you will send me $20 I will forward you a complete copy of the law, the names and address of the commissioners, their advertisement for plans, etc., from time to time, and any other matter of interest to you in this connection. I think I could be of service to you. Truly yours,

JOHN W. BLAKE.

We shall not presume to offer any explanation of this letter: doubtless Mr. Blake has a satisfactory one for any architect who will send him his twenty dollars. But the interesting thing is the success of the new Indiana State House. People are beginning, in the light of recent experience, to see how important it is to get the best architects for their public buildings; and in view of the temptations offered by the Indiana Legislature to architects to put themselves under hundred-thousand-dollar bonds to guarantee that their work shall be perfection, and to assume all the extra costs of it while some one else has the authority over it, and considering the volunteer "service" of Mr. Blake, we may look to see such an eagerness of competition as never was before, among the ablest, most experienced, and most honorable men in the profession.

THE Royal Institute of British Architects has lost one of its most famous members, though his infirmities had of late prevented his being publicly active, by the death of Sir Matthew Digby Wyatt, better known simply as Sir Digby Wyatt. He was born in 1820, studied architecture in the office of his almost equally famous brother, Mr. T. H. Wyatt, and gained the prize for an essay offered by the Architectural Society when he was only sixteen years old. From 1844 to 1846 he travelled on the Continent, studying and drawing old architecture; and he began his career on his return by arranging and decorating the new Adelphi Theatre. He was associated with Sir Joseph Paxton and Owen Jones in designing the first Crystal Palace for the "World's Fair" of 1851, the building of which he supervised, and on account of which he received a gold medal from the late Prince Albert. When the "Palace" was transferred to Sydenham he superintended the fine-arts department and decoration of it. As one of the British jurors at the French Exhibition of 1855, he received the decoration of the Legion of Honor. In the same year he was made Honorary Secretary of the R. I. B. A., which he continued to be for four years. He received in 1866 the Royal gold medal, the highest professional honor bestowed upon architects in England, and was knighted in 1869, in which year he was also appointed to the Slade Professorship of Fine Arts at Cambridge, an office corresponding to that held by Mr. Ruskin at Oxford. He was a member of a number of learned and professional societies, English and foreign, among others of the American Institute of Architects, and had received a decoration from the King of Italy.

SIR DIGBY WYATT was not one of the leaders in the recent development of English architectural style. He never fell away from his early training, which was classical and Italian; and so far as we know he never followed in his architectural designs the modern mediæval styles, certainly not any of the vagaries that have been developed out of them. A great part of his architectural practice was in the service of the East India Company. His last important work for this company was on the new India Office in London, to which he was appointed, after the competition of a few years ago, in conjunction with Mr.—now Sir Gilbert—Scott, the archi-

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tect of the Foreign Offices. It is as a master of decorative art and a writer upon it that Sir Digby is best known. His studies in this were necessarily in a great degree mediæval; and their influence on his architectural work was seen in a certain eclectic treatment of his Italian design. He was very much of a student, and made free use of the large professional library which he collected. His technical writings upon mosaics, illuminating, ironwork, and various industrial arts, and his lectures at Cambridge, are well known in his profession. His latest publication of any importance was the Architectural Note Book in Spain. The illustrations, somewhat roughly drawn by his own hand, hardly give indication of the masterly draughtsmanship which perhaps warranted him in once saying naïvely to an American visitor: "I suppose I can draw as well as any man in England; but a man cannot make drawings if he has work to do." His manner of writing is rather formal and cumbrous, but his essays are full of learning, good sense, and suggestion. He was an active and valuable member of the British Institute: the various volumes of its Transactions contain many valuable papers by him. One of his last public appearances at the Institute was when he presented to it at one of its meetings a portrait of his older brother, its former president, who still survives him.

ARCHITECTS will be interested in the question at issue between the Metropolitan Board of Works of London and the Royal Institute of British Architects, concerning the architectural treatment of Northumberland Avenue, one of the new thoroughfares which have been planned in the neighborhood of Charing Cross, and for which, making as it will the main avenue from Trafalgar Square to the Thames Embankment, Parliament some time ago authorized the purchase and condemnation of Northumberland House. As long ago as 1873 an act of Parliament provided that "the architectural elevations of all buildings to be erected under this act, fronting the Thames Embankment or fronting any street to be made under this act, shall be submitted by the Board to the consideration of the Council of the Royal Institute of British Architects, previous to the commencement of any such buildings." Submission usually implies control, and one would suppose that the obvious intention of such a provision was to secure the guaranty of the best professional oversight for the effective and harmonious treatment of the approaches to the embankment. But the Board, which has the reputation of being a hard-headed body, by no means disposed to surrender its privileges or invite interference, having, as we understand it, bought the site of Northumberland House and laid out its avenue across or along it, now proposes to sell out the abutting lots to private proprietors, and does not want its sales hampered by restrictions. The act which requires that the elevations shall be submitted to the Council does not distinctly require their approval, and the Board seems resolved to exceed the traditional possibility by driving not merely a coach and four but a whole thoroughfare through the act. It has presented to the Council for approval the elevations of buildings occupying a front of forty feet on one side of the new avenue. The Council naturally expressed unwillingness to commit themselves by sanctioning the independent treatment of so small a fraction of a frontage a thousand feet long, and suggested that the Board should present a design by which the general treatment of the whole should be governed with an eye to unity of effect; a proposition which would have seemed the most natural thing to a Parisian or a citizen of Vienna or Berlin. In answer to this the Board returned a resolution informing the Institute that while it could not carry out their suggestion of a uniform design for the whole street, it would take care that the rest of the designs should be in harmony with the first. The Board of Works and the Institute are not two bodies from whom a sympathetic co-operation was to be expected, especially if the first was to be a check upon the second; and though, according to the debate reported in the *Architect*, members of the Board were found wise enough to argue that Parliament had intrusted them with an important work which they were in danger of spoiling if they dealt with it piecemeal, the prevailing opinion seems to have been that absolute uniformity in a street — which was their interpretation of a general design — was objectionable, and that the "taste" of the Board was quite equal to the occasion. Whether the taste of the Institute was likely to be better, they did not seem to care to inquire.

INSECURE BUILDING.

THE accumulation of disasters to buildings during the last few weeks has awakened the public for the moment to a wholesome anxiety; and it has called out from many inconsiderate newspapers a storm of abuse against the architects of the country, as if they were all alike, none better and none worse than another, and as if they controlled all the bad building of the community. Considerate persons will not need to be reminded that architects are in their callings like other men, good, bad, and indifferent, and that if a building-committee or an individual client will go the right way to work, a good architect can always be secured. Admitting at the outset the facts that a thorough technical training is not so general among architects in the United States as it ought to be, and that half-taught practitioners and ignorant pretenders are much too common among them, — perhaps more so than in the older professions, though we are by no means sure of this, — facts to which we propose to return in another article, — we wish to suggest some other conditions that are overlooked by the public in its present excitement, while yet they are so important that as long as they remain unchanged there is no great hope that our building will be much better done than it has been.

In the first place it is not greatly worth while for people to complain that they are not provided with what they do not ask for. The public does not want good building, and therefore of course it does not get it. We do not mean that it declares no preference for good and substantial work over bad; but that it does not really demand the good, and is not willing to pay what it costs. It insists on building as cheaply as it can, and is readier to pay for show than for solid work. There is a standing complaint against architects that they are hard to control, and need constant restraint to prevent their spending excessively for architectural effect. But careful architects could generally say that it is quite as difficult to get their clients' consent to really first-rate construction as to a free expenditure for display. Architects, as a class, are not exempt from the common preference for show over substance: they like solid work however, and where they do not urge the kind of construction that they would like to use, it is often simply because they know that their proposals would not be listened to for a moment, or that if their designs were estimated according to their ideas of the best kind of construction, they would be rejected at once. The popular demand for cheap building and the desire for display are overwhelming, and carry almost every thing before them. Every one who puts up a building of course means that it shall hold together, for otherwise it would be useless — except where it is intended for immediate sale to the unwary. But he wants to do this as cheaply as he can, and is usually ready to assume a risk of insecurity in so doing, often not expecting his building to last many years, and forgetting that to make it really safe for one year it ought to be built to last a hundred. This desire to cheapen building encourages a hundred economizing inventions of the building-trades, and architects are forced to employ them, or at least are made indulgent to them by the popular pressure. The whole country — and indeed all other countries as well — is full of inventions for making a cheap substance do duty for a more costly one, or a little of one material serve instead of a great deal. These things employ an enormous amount of inventive labor, and this certainly not from the enthusiasm of inventing, but because there is an enormous and imperative demand for them. People are not wanting to argue that their cheap substitutes are better than the dearer originals. We have heard men argue that wood papers on plaster were better than wooden wainscoting, because they did not shrink. We remember a gentleman who had built a row of cottages on balloon frames, which had not a mortise or tenon among them, who boasted that they were "the stiffest houses in town," and that one might be rolled down hill without hurting it. He did not build them however, because he was an enthusiast for balloon frames, but because he wanted to save his pence. Somehow or other the cheap substitutes are never found to do the work of the

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things they supplant, and the people who employ and laud them do not at heart think they will: they fancy that they will "do," and they are willing to run a certain amount of risk.

People will have their great warehouses and conspicuous shops, their gilded hotels and theatres, and their showy houses. They must spend money to make them attract attention; they expect in this country a large return for their money invested; and when the expenditure of money brings neither rent nor consideration nor immediate comfort, they are very sparing of it. If a man errs a little in building on too large a scale or too ornately, he has at least for his return a little more space at command, or some additional gratification of his sense or his vanity; but if he puts an extra thousand of bricks into his walls or another thousand feet of timber into his floors, or a ton of iron into his beams, it has entirely disappeared to his eyes, and to most persons' judgment it is lost unless it can be shown to be needed to hold his building together as long as he wants to use it.

What wonder then that this haunting desire to save in construction continually tempts people to build as slightly as experience shows them that they can build with safety? that it makes employers look askance at expensive precautions, the necessity of which they can only take on trust? that it brings upon architects and builders a constant and dangerous pressure, urging them to keep as close as they can to the narrow but more or less indefinite line that divides security from danger, and leading to frequent transgressions of it?

The truth is that Americans as a people are not yet educated to a knowledge of the cost of good building. The whole mass of our building is of a kind that would be considered inferior in the older countries of the world. There are very few structures in any of our cities that would satisfy the building-laws of Paris or Vienna. Their cost in money has been high because materials are dear here, wages are high, and the hours of work short. But measured by the amount and quality of material and the work put into them, American buildings would rate very low in any European city. There has always been a hue and cry at the cost of our public buildings. There is no doubt that on many of them a great deal of money has been wasted by mismanagement; but setting aside some conspicuous failures, they have been, with few exceptions, the really good buildings of the country. Apart from jobbing, of which we suspect there has been much less than is commonly imagined, the impression is common that a great deal of money has been wasted in the actual labor and material consumed in them; but we believe very little of either has gone into them that would not have been thought essential in any country in which sound building was the rule. And their cost is really due, still with some exceptions, less to efforts at architectural magnificence than to what has been spent for the sake of thorough workmanship and sound and abundant material. If private buildings were undertaken on the same scale and with the same thoroughness, we think the cost of them would approximate surprisingly to that of the abused public work. Doubtless we shall in due time grow up to such standards of good buildings as are enforced by the experience of older nations. Then we shall find that our buildings will cost us more than they now do; but our recompense will be in the fact that they will be valuable and permanent possessions.

So long as there is no restraint on the demand for cheap and showy buildings; so long as clients come to their architects insisting on having more for their money than it will fairly pay for; so long as they require that their work shall be given to one man rather than another, simply because he will do it for less, without taking account of his habits of working; so long as they are content to put up buildings which they expect to last only a score of years, and prefer to risk their burning rather than to pay for making them incombustible, or their falling rather than to make them solid, — as older nations make them, — so long must we expect that the risks thus voluntarily incurred will turn out disastrous; and every now and then we shall be shocked by the news of a catastrophe like that of Rockford or Brooklyn. And as it is in the order of Providence that the innocent shall suffer for the guilty, the people who incur the risks will not monopolize the penalty. Speculators will keep on selecting incompetent or dishonest agents, and building treacherous buildings, unless they are restrained by law; and when the buildings burn or fall, the persons who are killed in them will be not the speculators but the public. But if the real danger is the public's, the power to control the danger also belongs to it, in its law-making capacity. To that it should look, and not waste its energies in scolding.

REPORT OF THE EXPERTS UPON THE ROCKFORD COURT HOUSE DISASTER.

To J. D. BURNS, ESQ., *Coroner of Winnebago Co., Ill.*

As requested by his Honor the mayor of the City of Rockford on behalf of the coroner of the county of Winnebago, and the jury now engaged in investigating the failure of the Court House in the city of Rockford on the 11th inst., we have carefully examined the plans and specifications of the building, the contract for its construction, the building itself, and the materials of which it is composed; and we have the honor to submit the following report of the results of such examination.

The plans and specifications have been very carefully drawn, with the exceptions of a few omissions. These plans and specifications are however not of themselves sufficient to control all important details, and could not be relied upon alone to secure a safe and judicious construction of the building, unless supplemented by the constant supervision of a thoroughly competent architect or superintendent as provided for by the contract.

The contract is very clear, explicit, and comprehensive. Henry S. Gay is in such contract recognized as the architect with the full supervisory powers and functions usually incident to such office. But it is further specified that there shall be a superintendent appointed by the supervisors, yet subordinate to the architect, whose specific duties and responsibilities are thus defined: "The superintendent shall at all times promptly and without delay object to any work or material proposed to be incorporated in said building, or being incorporated therein, whenever in his judgment the same shall not be of the style or quality of work, or the kind, quantity, or quality of material, required by the plans, drawings, specifications, or terms of this contract." The contractor assumes all the risks incident to the execution of the work of any kind whatsoever, and he is required to consult with the architect relative to matters that are not fully detailed or explained on the plans or specifications. By this it will be seen that the duties and responsibilities of all the parties concerned in the building are explicitly set forth. The architect is responsible for the correctness and sufficiency of the plans and specifications; the superintendent for seeing that nothing contrary to such plans and specifications is done, and giving immediate notice of such errors; while the responsibility of the contractor for the results of any errors or deficiencies is general. The architect has power under the contract to make any changes in the plans or specifications which may appear to him necessary; and the contractor is bound to execute the work according to the plans and specification so changed. The architect is to make monthly estimates of the materials furnished and labor done; and if an architect and superintendent, having been employed, had faithfully performed their duties as prescribed by the contract, it seems to us next to impossible that any serious defects in materials or workmanship could have crept into the building. We have made a careful examination of the building in its present condition in connection with the plans. The sides and back of the main pavilion with the front pediment have fallen, carrying down almost the entire interior and roof comprehended within the bounds of the court-room. By this examination we discover that nearly half of the pavilion was supported by two cast-iron columns.

The iron columns were of ample strength to carry the load intended to be placed upon them. The columns had cast-iron base plates two feet square and two inches thick.

These columns rested on a brick wall extending from the ground floor up through two stories thirty-one feet in height.

The foundation wall in sub-cellar and footings are of ample strength and dimensions.

The material upon which the foundation rests is a compact, incompressible bed of gravel of sufficient depth.

The plan shows the wall from the top of the ground floor to base of column to be a double wall twenty-five inches thick, composed of a wall 12¾ inches wide on the west side, and another 8¼ inches wide on the east side, with a space of four inches between. This wall forms one side of a double tier of fire-proof vaults, the roofs of which are of groined arches eight inches thick, of brick levelled up with concrete. The particular place where these columns stand is indicated by a projection on the east side into the vaults of 9⅝ inches, which is two feet four inches wide. This part of the wall is shown hollow, but was built solid from the foundation up; and this portion is figured on the plans to be two feet four inches from north to south, and two feet 10⅝ inches from east to west. A wrought capstone was provided for in the specifications (see p. 10, printed specifications), at the top of this part of the wall, and the specifications call for "all necessary bond stones for interior work." At this place in the wall the first departure from the plans was observed, from which in part has resulted the failure of

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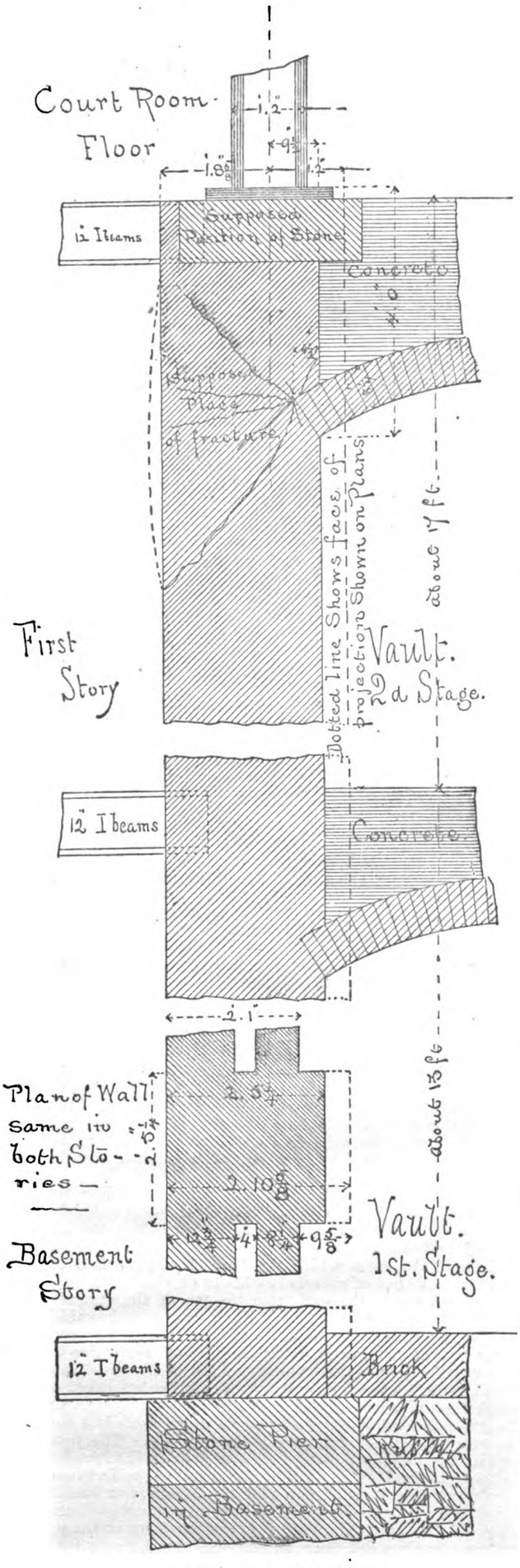

SECTION OF WALL AND COLUMN.

the construction, — on the north side of pavilion, which was seen to fall first. The projection on the east side of wall under the iron column, instead of being made 9⅝ inches, is by measurement only five inches. The size of the solid part as built, including the projection, is two feet five inches by two feet five inches.

At the level for arches over the first stage of vaults a skewback is cut into this projection five inches deep, and also in the part of the wall remaining in corresponding projection under the south corner of pavilion on the second stage; from which it is fair to presume that a similar skewback was cut into the projection under the columns on the second stage. The proper level for the lower line of the skewback, according to the plans, was four feet below the top of the wall. The wall in this place, which was the first point of fracture, is broken down through two-thirds of the height of the second stage of vaults. The cutting for skewbacks reduced the area of the solid part under column by 115⅝ inches, leaving the available part of the solid brickwork for effective service in resisting the load 4.8333 feet. The area called for by the plans was 6.7326 square feet.

It is said that there was a capstone on the wall, the dimensions of which are not known to us. The portion of the wall remaining has been critically examined by us. We found it badly shattered and of very defective material and workmanship. The bricks used in this portion, and generally throughout the building, are weak, very porous, and so soft as to be easily cut with a knife. The sand used in the mortar is of excellent quality, clean, coarse, and sharp. Little or no cement appears to have been used; and in most places the mortar appears deficient in strength, either from want of the proper quantity or quality of lime used, or from too rapid absorption of the water it contained, by brick laid dry. That the brick were laid too dry is evident from the fact that in most instances the mortar does not adhere to the brick, those taken out of the work being clean, or nearly so. The neglect to properly wet the brick was more serious in this case, as their capacity to absorb water is extraordinary. One of the best bricks that we could find in this wall, taken from its heart, weighing 3 pounds, 13¾ ounces, absorbed 14 ounces of water in 5½ hours, being over 22½ per cent of its weight; whereas a good brick should not absorb more than $\frac{1}{15}$, or 6⅔ per cent of its weight, this being less than one-third of the amount absorbed by the specimen in question.

While these facts render it apparent that the brick in question is entirely unsuitable for use in the construction of a building the character of the one under consideration, and where great strength is required, they are good brick for ordinary work.

The workmanship was found to be careless and imperfect. The thickness of the joints is excessive, with improper and imperfect bond; head and side joints many of them not filled with mortar, and no evidence of grouting having been done. The heading courses in places seen did not run through the full thickness of the wall. The failure to comply with the specifications will be evident by reference to the following extract: "All of the interior walls and backing to the stone will be of hard-burned brick of clear ring, firm and solid, and to be laid in mortar of lime and cement, and thoroughly grouted; the brick to be thoroughly soaked if laid in dry weather, and to be thoroughly set in mortar, and bonded together, headed every fifth course. The mortar to be of the best quality fresh hydraulic cement finely and properly ground, and fresh burned quicklime, mixed together thoroughly with clear sharp river or pit sand, free from loam or other foreign substances; the proportion of the different materials composing the mortar depending strictly on their quality, and cannot be definitely determined until tested. It is considered that the lime, cement, and sand can be used in equal quantities. The lime must be thoroughly slacked before it is mixed with the sand, and the cement added to the mortar at the time of using on the wall; no more cement to be prepared with the mortar than can be used by the bricklayers in each half hour. Mortar-joints not to exceed three-eighths of an inch."

Our observations convince us that the first failure of the wall took place at a point under the column at which the wall was weakened by the upper skewback cut into it. The wall yielded by crimping on the side containing the skewback, and bulging on the opposite side. This method of yielding was rendered more certain by the position of the column, its axis being as indicated by the plans, 3¼ inches from the centre of the wall in the direction of the skewback.

The omission of 4⅝ inches from the projection on the vault side intended for its better support, and the cutting of the skewback practically reducing that side of the wall by 9⅝ inches, really left the axis of the column $8\frac{5}{8}$ inches off the centre of solid brickwork as built. That the wall did thus fail is further evident from the situation of the column as it now stands, the bottom being nearly under its original position, the top resting against a portion of a wall that remains standing.

We carefully computed the weight to be borne at the base of one of the iron columns above mentioned, from the data furnished by the plans and specifications, and the measurement of a portion of the work at the building. The information we have obtained has not been sufficient to enable us to make an absolutely accurate calculation of this weight, but it is believed to be a very close approximation to it. It has been found to be $147\frac{58}{100}$ tons, as is shown by the following statement in detail: —

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1 iron column with cap and base plate	6,189 lbs.
1 short column over it	373
Plates for short column	115
Consoles	455
Shell cap	120
Shell base	460
Iron girders for pavilion of dome	4.469
Iron girders for ceiling	1,360
Brickwork under pavilion at 112½ [lbs. per c. f.]	13,664
Brickwork with ashlar facing under dome at 125 [lbs. per c. f.]	36.135
Stonework of cornice and pediment	114,172
Weight of portions of vault roofs resting on pier	6,075
Weight of iron I-beams in tower floor	1,105
Truss beams under side roof of court-room	402
Truss beams under side roof of court-room timber	1,560
Hip rafters	500
Truss for skylight opening and header	860
Anchors in tower 200, and chains 317	517
Weight of anchors and concrete in tower floor	8,190
Roof and roof covering at 45, and accidental weight at 20 [sq.ft.]	59.280
Weight of ceiling at 15 lbs.	20,609
¼ of skylight and glass	490
Finial, clock, and ribs in pavilion (estimated)	1,000
Load on floor over vault at 80	600
Weight of additional thickness of pavilion wall	16,576

Tons $147\frac{578}{1000}$ = 295,157 lbs.

Force of greatest wind adds weight to one column of about 7½ tons.

According to the plans there was provided to sustain this weight an area of 6.7326 square feet. We estimate the safe load to be borne by brickwork of the quality required by the specifications at twelve tons to the square foot, giving a bearing capacity to the solid part of wall of $80\frac{79}{100}$ tons, as against the load just mentioned of $147\frac{58}{100}$ tons, showing an excess of load over safe sustaining power of $66\frac{79}{100}$ tons. This load would have put a weight of $21\frac{9}{10}$ tons on each square foot of brickwork, or an excess of $9\frac{9}{10}$ tons over safe load. For this over-estimate of the strength of the brickwork, we think the architect who made the plans and specifications is responsible.

Rankine after describing an excellent brick says, "A small pillar of brickwork made of bricks of this quality laid in cement should require from 800 to 1,000 lbs. on a square inch to crush it." Taking the mean of these two figures, namely 900 lbs. per square inch, and we have for the ultimate strength of brickwork per square foot, 129,600 lbs. or $64\frac{8}{10}$ tons. Now taking $\frac{1}{6}$ of this as the safe load, and we have as the admissable load on the brickwork in question $10\frac{8}{10}$ tons per square foot. The department of public works in Berlin allows as safe load a pressure of 200 lbs. per square inch where the best of bricks and cement are used. This is equivalent to $14\frac{4}{10}$ tons per square foot.

The practice of architects in this country we think will justify us in assuming as the safe load on brickwork of the character set forth in the plans and specifications before us, twelve tons per square foot; this limit lying nearly midway between the British and German practice as above set forth. We see from these facts there would have been great danger of failure even if the brickwork had been of the quality described in the specifications, and of the dimensions shown on the plans. It may be observed however, that had the whole wall been of the quality of materials and work specified, the weight would have been distributed over a larger surface of the wall from the base of the column downward, and so the danger of failure lessened; a result not relied upon in correct practice unless for special reasons and provided for. We remark that parts of walls upon which these columns stood, being obliged to carry greater weights than any other part of the brickwork, should have received from the architect under any circumstances special attention as to their design and erection.

We will now consider the conditions which would have existed at the time of the failure of the work, had the plans and specifications been complied with. The actual weight at that time at the base of the iron column, as computed by us from the same data from which we have computed the ultimate load, was $102\frac{494}{1000}$ tons. Taking the safe load at 12 tons as before, giving a bearing capacity to the solid part of the wall of $89\frac{79}{100}$ tons, we find that there would have been an excess of load over safe sustaining power of $12\frac{764}{1000}$ tons. The actual load per foot would have been $15\frac{22}{100}$ tons, or an excess of $3\frac{22}{100}$ tons per square foot over safe load.

The omission of a portion of the projection as provided for on the plan, and the further reduction of the area of the wall by the cutting in of the skewback, reduced the area to 4.8333 square feet. This area had a weight to sustain at the time that the accident occurred of $102\frac{494}{1000}$ tons, which amounts to $21\frac{207}{100}$ tons per square foot, or an excess of $9\frac{207}{100}$ tons above safe load of good brickwork. Under this excessive load the wall failed, a result clearly traceable to excessive load, bad material, and faulty workmanship.

RELATING TO PRACTICE.

1. The architect, having enjoyed full supervisory powers over superintendent and contractor, should have visited the work as often as was necessary in his judgment, to detect and provide against any serious deviation from the plans, specifications, and contract. He is responsible for his opinions in approving the employment of any particular material.

2. The fact that soft and weak bricks were employed made it all the more the duty of the superintendent to exercise proper diligence in seeing that they were well laid. The almost uniformly bad nature of the brickwork shows that this cannot have been the case, or at least that whatever he may have done in this respect was inoperative.

3. The soft and weak bricks being employed, the contractor is all the more responsible for laying them in a negligent and unworkmanlike manner, thereby adding to rather than ameliorating the deficiencies of the brick.

GENERAL CONCLUSIONS.

From the information obtained by us from the contract, plans, and specifications, and examination of the building, we have been led to the following conclusions: —

1. That the architect has failed to make a sufficient calculation of the necessary strength of the brickwork in the parts of the building under examination, to sustain the ultimate load. That had the provisions of the plans and specifications been complied with, while we would not deem it wise construction, the margin that exists between safe load and ultimate strength is such as to render it probable that failure would not have occurred as it did. This margin should be preserved as provision against accident from extra strain or shock from wind or other causes. That the imperfections existing in the work, and the non-compliance with the plans and specifications, could have been detected at any time up to the erection of the brickwork of pavilion wall, in time to avert the disaster by proper remedies.

2. That the superintendent in charge of the work was responsible for the existence of these defects, they having been in clear view for many months.

3. That the contractor is responsible for the non-compliance with the plans and specifications, and the defects in the materials and workmanship; and under the contract, the failure of the superintendent or architect to notify him as to these deficiencies and order the work to be stopped, does not relieve him of the responsibility in the least.

4. That the appointment of a superintendent by the Board of Supervisors and not by the architect, and the placing thereby of the responsibility for the faithful performance of the duties of the superintendent upon the Board of Trustees and not on the architect, is an example of bad practice in the administration of the construction of public buildings.

(Signed) EDWARD BURLING, *Architect.*
WM. SOOY SMITH, *Civil Engineer.*
P. B. WIGHT, *Architect.*

Sworn to before the coroner and jury, May 17, 1877.

SUPPLEMENTARY REPORT.

To J. D. BURNS, ESQ., *Coroner of Winnebago County, Ill.*

In accordance with the request of the jury now investigating the cause of the fall of a portion of the new County Court House, we have examined the three sets of drawings submitted to us, namely, one set on paper, comprising the general floor plans, elevations, and sections, ten in number, called the "architect's plans;" another set of plans on tracing muslin, ten in number, and also comprising the general floor plans, elevations, and sections, called the "county's plans;" and another set comprising the foundation plan and the first story plan, on tracing muslin, called the "contractor's plans."

We compared these sets of plans together to ascertain points of correspondence and divergence between them, as well as to find the proper constructive correspondence or divergence between the respective drawings.

The following notes were taken in the order in which the drawings were examined: —

Foundation Plan. — There were no discrepancies between the architect's and county's plan, and a few omissions of figures on contractor's plan.

First Story. — Portion of wall sustaining pavilion columns shown hollow on county plan, and lines of hollow space drawn through on contractor's plan; *the space between on the contractor's plan being colored.* Lines on county plan drawn across wall and figured 2′ 4″ apart on east support for pavilion, and not figured on west pier. On contractor's plan a line drawn full across the wall on the west side of each pier, and a line broken by a dot on the east side of each pier. The lines are figured 2 feet 4 inches apart on the east pier. The distance of these lines apart on the west pier is not figured. There were no discrepancies between the architect's plans and the county plans in these piers. Pencil marks on the hollow space were seen on the architect's plans. There was an omission on the county plans of figures on architect's and contractor's plan, showing distance of centres of south piers from inside of corridor walls. The county and contractor's plans of this story are undoubtedly tracings from the architect's plan.

Basement. — On the architect's plan, the lines drawn across the walls of parts supporting pavilion are dotted lines, with full lines drawn over. On the county plans, the corresponding lines are dotted lines.

The Court-Room Floor. — On the east side of court-room, the figures of spaces between the centres of central brick pilasters are each figured on architect's plan 15′ 11½″, and on county plans 15′

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11 1/16", making the sum of both spaces 1/8 of an inch greater on county plans than on architect's.

The general figures across court-room on the opposite side show a total length of 78 feet 2 inches on both plans, and the additional length of 1/8 of an inch is indicated in a line of detail figures on the county plans only. No other discrepancies in figures were found between the architect's and county plans of this story; but there were a few omissions on the county plans of figures seen on the architect's plan. No discrepancies except those above noted were found between any of the plans submitted to us.

The signatures of the Building Committee are on all the architect's plans and all the county plans.

Respectfully submitted,

EDWARD BURLING, *Architect*,
WM. SOOY SMITH, *Civil Engineer*,
P. B. WIGHT, *Architect*.

(Submitted while under oath as witnesses.)

THE ILLUSTRATIONS.

HOTEL AND RESTAURANT FOR THE N.Y. AND MANHATTAN BEACH RAILWAY COMPANY. J. PICKERING PUTNAM, ARCHITECT.

(4 Pemberton Square, Boston, Mass.)

THIS building is now in process of construction on Manhattan Beach belonging to the Company, east of the ocean concourse on Long Island. The beach, over two miles in length in a gentle curve, is one of the finest on the Atlantic coast, and will this summer be readily accessible from any part of New York and Brooklyn in about half an hour by ferry and railroads now approaching completion. The hotel is to be built on hard pine piles or posts 8" and 12" in diameter, with a very heavy frame, strapped with iron to the piles and well braced and trussed to withstand the severest winter gales. Its total length outside of every thing will be about five hundred feet, and the total depth from front to rear is nowhere less than two hundred and twenty-five feet. Behind the hotel proper is a train shed for the arrival and departure of trains, with a wide passage-way to the front. The building contains a large dining-hall 68' x 100', and restaurant and lunch-room of the same dimensions. In addition to these are to be open-air dining and lunch rooms of nearly equal capacity, they being of the same character as those which proved so popular at the Centennial Exhibition at Philadelphia. There are to be one hundred and fifty sleeping-rooms, besides numerous private dining-rooms, parlors, etc. The kitchen accommodations are of the amplest kind, being sufficient in capacity to provide for at least ten or twelve thousand persons daily. The total cost of the building completed will be about $100,000. The towers will contain colossal water-tanks for the ready distribution of water to all parts of the building in case of fire; and the building is to be provided with steam radiators for winter use, with electric bells, gas, and plumbing.

WEST MIDDLE SCHOOL, HARTFORD, CONN. MR. R. M. UPJOHN, ARCHITECT.

(Trinity Building, New York.)

The West Middle School is built of brick with Cleveland stone wrought work. There are four floors; the basements for play-rooms for the children, for furnaces, and for other conveniences. The ground floor and second stories are divided into eight school-rooms, each room accommodating fifty pupils. All the rooms are perfectly lighted, heated, and ventilated. Proper cloak-rooms are provided for each of the rooms. The staircases are at each end of the building. The top floor is appropriated for an exhibition-room, and is about sixty feet square. There are no wooden partitions in the building. The cost of the building with the steam-furnaces was $100,000.

OSSEO LODGE, W. VA. MR. CARL PFEIFFER, ARCHITECT.

(113 Broadway, New York, N.Y.)

PROFESSIONAL PRACTICE AND CHARGES OF ARCHITECTS.

IN answer to the request of a correspondent in Ottumwa, Io., who wished us to publish in our columns "a list of the latest architects' prices," we give the charges that are usually and properly made and indorsed by the American Institute of Architects.

For full professional services (including superintendence), 5 per cent upon the cost of the work.

Partial service as follows: —

For preliminary studies, 1 per cent.

For preliminary studies, general drawings, and specifications, 2½ per cent.

For preliminary studies, general drawings, details, and specifications, 3½ per cent.

For stores, 3 per cent upon the cost, divided in the above ratio.

For works that cost less than $5,000, or for monumental and decorative work, and designs for furniture, a special rate in excess of the above.

For alterations and additions, an additional charge to be made for surveys and measurements.

An additional charge to be made for alterations or additions in contracts or plans, which will be valued in proportion to the additional time and services employed.

Necessary travelling expenses to be paid by the client.

Time spent by the architect in visiting for professional consultation, and in the accompanying travel, whether by day or night, will be charged for, whether or not any commission, either for office work or superintending work, is given.

The architect's payments are successively due as his work is completed, in the order of the above classifications.

Until an actual estimate is received, the charges are based upon the proposed cost of the works, and the payments are received as instalments of the entire fee, which is based upon the actual cost.

The architect bases his professional charge upon the entire cost to the owner of the building when completed, including all the fixtures necessary to render it fit for occupation, and is entitled to a fair additional compensation for furniture or other articles designed or purchased by the architect.

If any material or work used in the construction of the building be already upon the ground, or come into possession of the owner without expense to him, the value of said material or work is to be added to the sum actually expended upon the building before the architect's commission is computed.

Drawings, as instruments of service, are the property of the architect.

By order,

RICHARD UPJOHN, *President.*

A. J. BLOOR, *Secretary.*

CORRESPONDENCE.

THE BRICKMAKERS' STRIKE. — THE CAPITOL APPROPRIATION. — THE KELLUM LAW-SUIT. — A PRIVATE RESIDENCE. — OVERSIGHT IN REBUILDING. — ALMOST AN ACCIDENT.

NEW YORK.

THE brickmakers are running riot at the brickyards up the Hudson. Haverstraw has been in a state of siege for several days past; the streets thronged by groups of the lowest grade of brickyard employees. There has been a succession of strikes in the yards of late. The old men went out on strike, new men took their places; then another turn brought back the old hands at the reduced wages offered by the yard-owners; and then came a general uprising, the new men, re-enforced by delegations of roughs from this city and from the towns of the Hudson, making visits from yard to yard with clubs and stones, compelling a cessation of labor, overturning tiers of green brick, until out of fifty or more yards less than half a dozen have been unmolested. The militia have been called out to keep the rioters within some bounds, but thus far neither arson nor manslaughter has been committed. On Friday, 25th inst., a meeting of yard-owners was held, and the following determination unanimously carried: —

Resolved, That the scale of wages adopted by the brickmakers this spring be strictly adhered to; to wit, thirty-eight dollars for sanders, moulders, and dumpers, and thirty-five dollars for kiln-shed men.

Some were in favor of closing the yards; and judging from the quantities of brick in stock, and the slow demand, no great inconvenience would have been felt, had this been carried out; but objection was made that a lock-out would deprive the willing ones of the opportunity to work. It was resolved, against the usual custom of full monthly payments, to pay off the men what was due them for the current month up to the date of the strike. Thus far the strikers have been treated very leniently; but the prospects are that within a few days a number of arrests will dampen the ardor of the mob, and the great Haverstraw yards be once more in operation.

The Albany Capitol has received an allowance of $500,000, after the $1,000,000 appropriation had received a very flat-footed veto from the governor. The advocates of the Capitol extension roused up the Albany mob to a very noisy display of lobby tactics; and the governor, despite his opinion that a delay of a year on the Capitol work would work no injury to the public interest, very meekly agreed to a compromise of half a million dollars.

The Kellum case has advanced another stage through its law course. This, it will be remembered, was a suit brought by Hannah Kellum, widow and executrix of Mr. John Kellum, architect of the new Court House, so intimately associated with the Tweed robberies. His compensation was fixed at three per cent of the entire cost; and large sums were paid on account, Mrs. Kellum suing for the remainder. The city defended on the ground that it had been subjected to needless expense by reason of the unskilful manner in which the work had been performed under the direction of architect Kellum, the damage to the city resulting therefrom exceeding the claim put in. Evidence was put in on the several technical grounds sustaining the city's defence, and a verdict was rendered against the Kellum claim. From this judgment an appeal was made to the general term of the court; and a few days since, the opinion of the court written by Judge Daniels held that the defence was legally made out, and says that services of this kind, if undertaken, the law requires to be exercised with

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care and skill commensurate with the undertaking. The audit of the bills claimed by the supervisors was no bar to going behind the audit into the question of skilfulness.

Jardine Brothers have in hand a residence for J. A. Bostwick, corner of Sixty-first Street and Fifth Avenue, on a plat 30 x 100 feet. A three-story and mansard roof residence is to be erected at a cost of over $100,000. The plan is not peculiar, having the usual stoop and corridor with stairs, flanked by the parlors 36 x 14 feet, and dining-room 14 x 23 feet. The basement has billiard-room 25 x 19 feet, with kitchen. Service stairs are provided at the rear of the building, with an hydraulic passenger-lift. For working this, a supply of water has been provided in a vault capable of holding 16,000 gallons, a pump forcing the water to a tank in the attic, the fall again working a series of buckets, and giving power to the elevator. The fronts of the upper floors are thrown into large rooms, a sitting room on the second, and a play room on the third floor. The floors are laid with iron beams and fire-proof filling. Steam heating will be employed, and from the boiler in the cellar a series of pipes will be laid under the sidewalk flagging, into which heat may be turned to melt the snow falling upon it. The finish within is to be in cabinet work throughout, without regard to expense; nothing is to be spared. The stairway is to be carried up in marble, with bronze hand-rail, elaborate wall decoration and fresco. Without, Connecticut brown stone is alone employed, excepting only a pair of polished granite columns flanking the main entrance. The stonework in place of the usual four-inch veneer blocks is to be solid with chamfers and returns of windows, etc., on the solid block.

The Building Department has recently been taken to task for its blindness in not seeing a violation of the law in the erection of a business building on Crosby Street on a portion of the plat burned over by the great 444 Broadway fire in February, 1876. One complaint then was that the great interior spaces of the building created such a volume of fire as to defy the efforts of the firemen. Except in cases of theatres and other public buildings the law requires a solid brick bearing wall at intervals not greater than fifty feet. In the Crosby-street structure iron columns were used, the intercolumnar spaces filled in with concrete blocks; and it was not until the Insurance Board advised a refusal to write policies on the building that the Building Department roused itself to order a change.

From Binghamton in this State comes a strange story which should teach the necessity for a periodic inspection of all public buildings. On Friday the great five-thousand-pounds bell hang-in the tower over the front vestibule of the First Presbyterian Church did not work as usual; and the sexton ordered Mr. William Scott, a neighboring mechanic, to go up and correct the wrong. A hasty examination showed that the clapper was loose; and this was fastened back, and the bell tolled on Sunday with a separate hammer, without rocking the bell. On Monday Mr. Scott went up to make a more thorough inspection and repairs; to his surprise he discovered that the head of the bolt upon which the bell was suspended from the rocking-bar was broken off and the whole mass of metal held only by a slight swell in the bar, and that this too had nearly pulled through. A single half-turn might have brought the whole down to the destruction of the great organ and the very possible loss of life in the church lobby below.

THE CENTRAL PARK.

NEW YORK, May 19, 1877.

TO THE EDITOR OF THE AMERICAN ARCHITECT.

Sir, — I have hesitated to recur to the matter of my former brief note, but submit that the credit of the profession your journal represents is enough concerned to justify the publication of a fuller statement of the facts which prove to be in question. The case is this: The Institute of Architects had published an interesting paper prepared by its Secretary for a national and international occasion, and which was likely to be preserved abroad and at home as an abstract of the history of architecture in America. Its compiler, living in New York, had given special consideration to the work of his contemporaries of that city, which he registered by decades. Half the space of the sixth decade he thought proper to appropriate to the Central Park, in the account of which I was credited with all that is respectable of the general design, and Mr. C. Vaux as holding a consulting and somewhat questionable position with reference to the architecture only.

Regarding this account as defective from inadvertence, I could not do less than supply the brief correction which you published on the 14th ult. It appears, however, from the note which it has drawn out, that there was no inadvertence, and that it is still believed that in all particulars of special interest to architecture the record is authentic and complete.

In my judgment, if the design of the park has any special interest to architects at all, it lies in a few circumstances which have been thus wholly lost sight of, and which, to relieve them for the moment as much as possible from any personal bearing, I will narrate as follows: —

Years ago a young English architect, returning from a professional tour on the Continent, contributed drawings to an exhibition in London, the subjects of which and their treatment led to his being sought out by Mr. A. J. Downing, at whose invitation he soon afterward came to and established himself as an architect in America. He here became not only the intimate friend but the professional partner of Mr. Downing, a man who more than any other in my knowledge possessed the attributes of genius both in the art of landscape-gardening, and in that of conveying to others an understanding of the conditions of success in that art. It was through the exertions of Mr. Downing that the project of a park in New York first became popular; and when five years after his lamented death a plan for the Central Park was wanted, there was no man to whom it came more naturally, properly, and in due sequence of a strictly professional career, to undertake to provide it, than to the architect who had been his chosen disciple, and enjoyed the privilege of aiding him in his latest and best work.

In due time with the co-operation of an associate whom he had selected, invited, and with some difficulty persuaded to join him, a study was produced, which being submitted in competition was adjudged the best of thirty-three which had been offered in conformity with the rules prescribed, all but two or three of the remainder being the work exclusively of men untrained in architecture. The design was adopted, and though many details have been introduced in an outlay since made of over eight millions of dollars, it has been substantially adhered to. After nearly twenty years of growth following labor, and labor waiting on growth, the intended landscape effects are beginning to be disclosed. They are found worthy of praise in an architectural record; but all the circumstances above indicated, by which they are more directly related to the interests of architecture as a professional pursuit, are forgotten.

There is a popular impression about architects, on account of which, if there were no other reasons, it is proper they should be recalled. I mean the impression that the special training of an architect, and his habit of dealing almost exclusively with rigid materials, disqualifies him for co-operating intimately, cordially, and successfully, in works of landscape design.

For the same reason, testifying now as the associate of Mr. Vaux in the design of the Central Park, I personally owe it to his profession to say that in his discussion even of such matters as the shaping of embankments, the disposition of rocks, the outlining shores and of plantations, and in determining the exact adjustment to natural conditions of roads and walks, with the purpose of bringing means of convenience relatively large into tolerable subordination to means of developing picturesqueness through objects necessarily restricted in breadth and in detail, methods of study acquired in the training of the architect proved not only no obstacle to satisfactory results, but manifestly a great furtherance.

You will see by the accompanying copy of the London *Garden* that I have before now been led by the conviction thus expressed, in addressing those who stand for the other side of the question, to urge that architects should always be associated in the general design of important landscape undertakings; and in the public works in which I have been engaged since my partnership with Mr. Vaux expired, I have secured such co-operation.

And I may properly add that a gentleman who has had a wider range of practice, and been connected with more important works in landscape than any other in Europe, has, since this publication in the *Garden*, privately advised me that his own experience has led him to place a similar estimate in this respect on the value of architectural training as an auxiliary element in landscape design.

There is a second question as to which I will, if you please, at another time state facts which have equally been forgotten with those mentioned in this letter. What I have now said must make it sufficiently clear that in an architectural minute as to the design of the Central Park, if but one man's name is to be mentioned, it is courtesy overmuch to make it that of your obedient servant,

FREDERICK LAW OLMSTED.

TRAPS.

NEW YORK, May 13, 1877.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — In your issue of April 28, Mr. Normand S. Patton of Chicago calls attention to my statement that in draining houses "I take the precaution to use traps which cannot lose their seals from any cause except evaporation," and asks whether there are such traps, and where they can be obtained.

In reply to this inquiry I would say that any of the traps in common use will hold their seals if properly vented. Mr. Patton says, —

> "It is well known that the traps almost universally used in plumbing, viz., tubes bent in the form of an S, are very liable to lose their seals by being 'siphoned out.' Ventilation of the waste-pipe will not prevent this; and the only remedy seems to be the adoption of an improved form of trap. Although attention has frequently been called to this imperfection in water-traps, I have yet to learn of any movement among architects or plumbers to secure any improvement. What is wanted is a trap through which air may be forced without driving out the water sufficiently to unseal it. Such a trap can be easily constructed. Are there any in the market?"

The venting of the soil-pipe will guard the water-seal of an S trap against ordinary accident, but does not afford absolute secur-

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ity. This can be attained by venting the traps independently of the soil-pipe by carrying an air-pipe from the top of the bend, as shown in the drawing marked Fig. 1. These air-pipes may be carried into the soil-pipe above all branch wastes, or run into a single

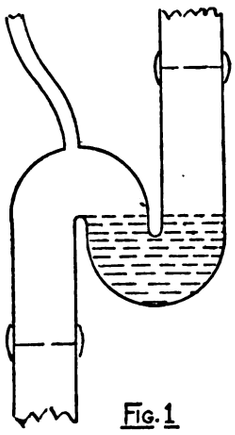

FIG. 1

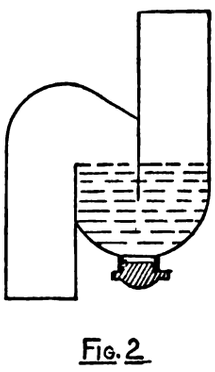

FIG. 2

pipe and extend through the roof separately. The admission of air at the crown of the bend below the seal renders siphoning impossible, and insures a seal the full depth of the dip. This may be lost by evaporation, or drawn off by a thread or string or bit of rag lodged in the trap and hanging over the bend; but such accidents are not likely to occur, and are of necessity common to all traps sealed with water.

Of traps which will hold their seals without separate venting, there are a great number in use. The best form of trap which has come to my notice is that shown in the drawing marked Fig. 2. This trap, in several forms, was invented by Mr. John Foley, an intelligent practical plumber of Brooklyn, and has been very successfully and generally introduced by Messrs. F. Adee & Co., of New York. I can say from my own knowledge, gained from careful experimental tests, that it is impossible to unseal this trap by driving air or water through it, and that it meets all the conditions which Mr. Patton states to be essential in a perfectly satisfactory trap. The area of water surface in the body of the trap being two and a half times as great as the area of the pipe, enables it to retain a half-inch seal even when air is blown through it with considerable force. The peculiar shape of this trap gives it other advantages which need not be noted here.

Respectfully, JAS. C. BAYLES.

NOTES AND CLIPPINGS.

DEDICATION OF A GERMAN CATHOLIC CHURCH. — The new Church of the Holy Trinity, built by German Catholics and situated on Shawmut Avenue, Boston, was dedicated May 27, Trinity Sunday. The church was built from the plans of P. C. Keeley of Brooklyn, N.Y., who was also the architect of the Boston Cathedral. It is a hundred and fifty feet in length, seventy-four feet in width, and from the floor to the apex of the central arch the distance is fifty-eight feet. It consists of a nave and two aisles, each of which terminates with an altar, that of the nave being placed in an apsidal recess. It is in effect three churches under one roof, for the pillars that support the clere-story are so arranged that, while standing either in the nave or in either of the aisles, the altar at its end is the principal object in view. On the north side of the nave is the pulpit, which is elevated about four feet from the floor. It is built of black walnut and light woods, and is surmounted by a sounding-board. On the edge of this board are the emblems of the four evangelists. The building has a seating capacity of 1,100, and it is fitted with pews of chestnut trimmed with black walnut. The chancel-rail is of black walnut. In the centre of the chancel is the high altar, which is dedicated to the Holy Trinity. Although built of wood, it has the appearance of being of marble. Like every thing else in the church, it is a Gothic structure. At the head of the north aisle is the altar of the Blessed Virgin, and terminating the other aisle is the altar of St. Joseph. The most beautiful features of the structure are the stained-glass windows, which are gifts. The cost of the church was about $200,000.

AN UNUSUAL CHURCH PLAN. — The new edifice for the Baptist Church on Pierrepont Street, Brooklyn, is now in course of erection from plans by L. B. Volk, and will present several noteworthy peculiarities. The building measures 100 x 113 feet, in which will be the auditorium, of amphitheatrical shape, without columns. The two striking features are the elliptical form of the auditorium, which has a length of 92 feet, the largest diameter extending well into two opposite corners, and the gallery which slopes down to the main floor from all sides. Encircling the auditorium, beneath the gallery, is a broad corridor connecting the three entrances, which are placed at corners of the building opening directly upon the sidewalk, the fourth corner being occupied by the pulpit and space for the choir. Mr. Volk promises one of the finest auditoriums in the country: it will have a lofty ceiling forty feet in height. The edifice will be completed next January, at a cost not exceeding $50,000.

DANVERS BRICKS. — Eleven millions of bricks are made annually in Danvers, Mass.

THE CINCINNATI CUSTOM HOUSE. — A large number of workmen have been discharged from the United States Custom House, and it is feared that the construction of the building will be partially suspended for some time, owing to the failure of the contractors to deliver the granite. The cutting of granite at the quarries has also stopped until after the Secretary's decision on the report of the commission recently appointed to ascertain the terms upon which work may be resumed under the fifteen per cent contracts or modifications thereof.

THE EXISTING GOVERNMENT CONTRACTS. — The commission to consider the contracts for the completion of public buildings held a meeting May 28. Almost all the contractors for supplying stone have manifested their willingness to consent to the abrogation of the 15 percentum contracts and enter into new ones at lower rates. The contractors propose to reduce the wages of the stone-cutters, which they say are too high. The commission expect to make new contracts so as to save the Government 25 per centum on the prices now paid.

A LONG TUNNEL. — Baltimore is constructing the longest tunnel in the country. When completed it will be seven miles long, circular in shape, and twelve feet in diameter. Five miles of the distance is through very hard rock, and the drilling is done by manual labor, powder-drills being impracticable in such a small space. The rest of the wall will be bricked. Fifteen shafts have been sunk. The cost is estimated at $3,000,000; about 1,500 men are employed, and the tunnel will probably be completed in three years. The object of the tunnel is to supply the city with water, the present supply having proven inadequate and of wretched quality.

THE FIRES IN 1876. — There were in the United States, during the year 1876, 9,301 fires, destroying property to the aggregate value of $73,775,000 — of which $38,262,000 was covered by insurance. The total loss was $12,552,000 less than in 1875, and the insurance $5,369,000 less. The losses for 1876 were about one-half of one per cent of the assessed valuation of all the taxable property in the country.

ILLINOIS MOUNDS. — At a late meeting of the Philadelphia Academy of Sciences, Mr. John Ford described a group of eight burial-mounds opened by him near Coup's Creek, Macoupin County, Ill. Each of the graves was lined with stone slabs, and after the bodies were placed in position within, earth had been packed around them so as to fill the enclosure. All the skeletons found in these graves faced the east. In one of the graves four skeletons were found, seated in two pairs, the knees of one pair pressing against the backs of the other. The arms were crossed. In the right hand of each individual thus interred, a large marine shell (*Buccinum perversum*, Linn.) had been so placed that the small end of the shell rested in the hand and the large end in the hollow above the left hip. Within each shell what appeared to be the bones of a child were found, whose skull had been crushed before burial, the skull protruding beyond the aperture of the shell. It is thought that these infants were sacrificed to the dead. In most of the graves the left side of the skulls of the adults appeared also to have been crushed by some blunt weapon.

A TECHNICAL UNIVERSITY IN LONDON. — About $50,000 have been conditionally subscribed towards founding a technical university in London, under the auspices of the livery companies, among whom are found the Mercers', Drapers', Fishmongers', Goldsmiths', Clothworkers', Armorers' and Braziers', and Plasterers' companies.

THE ELGIN MARBLES. — Several new fragments belonging to the Elgin sculptures in the British Museum have lately been discovered in excavations made on the south side of the Acropolis at Athens. The identification has been made by means of plaster casts forwarded to the Museum.

WATER-GLASS. — The suggestion of Baron Von Liebig, touching the production of water-glass from infusorial earth, was not brought into practical use, owing to the fact it was until recently impossible to obtain calcined earth. Since Messrs. Grune and Hagemann, of Unterluss, near Erschede, have succeeded in calcining and bringing the infusorial earth at small cost into the market, Capitaine has taken up this long since suggested method. He places caustic soda of a specific gravity averaging from 1.22 to 1.24 in a digester supplied with a stirring apparatus, and adds thereto such a quantity of calcined infusorial earth that to every part of iodic hydrate 2.8 earth are present. Steam at a pressure of three atmospheres is admitted, and a perfect solution results in a few hours. The end of the operation is recognized by the clearing of the caustic solution and the deposition of a dark brick-red precipitate. A surplus of earth must be avoided, as the solution will not clear on these conditions. It is also to be observed that the solution should not obtain a greater specific gravity than 1.18. If caustic soda of 1.30 specific gravity be taken, the resulting water-glass will have a specific gravity from 1.22 to 1.25, and will clear in less than a week. It is advisable to dilute to a specific gravity of 1.18. On account of the condensation of the steam, the water-glass is always of smaller specific gravity than the caustic soda. Capitaine is of the opinion that water-glass prepared by the wet way can compete commercially with the glass made by any other method in all such localities where the cost of transporting the infusorial earth does not exceed 15 or 20 per cent of the original cost.

THE BOSTON BASILICA. — The *Architect* states that Trinity Church is called the "Boston Basilica." Why it should be so called, we are unable to guess.

A CURIOUS ASSOCIATION. — The Registrar General of Great Britain classes saddlers, shipbuilders, architects, surveyors, builders, carpenters, and joiners together, and says that of this class there are in London thirty-two thousand.

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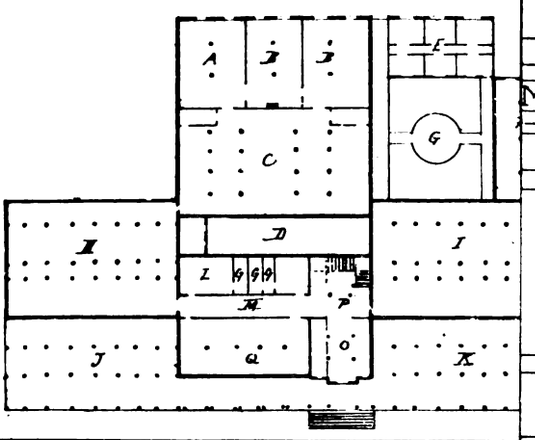
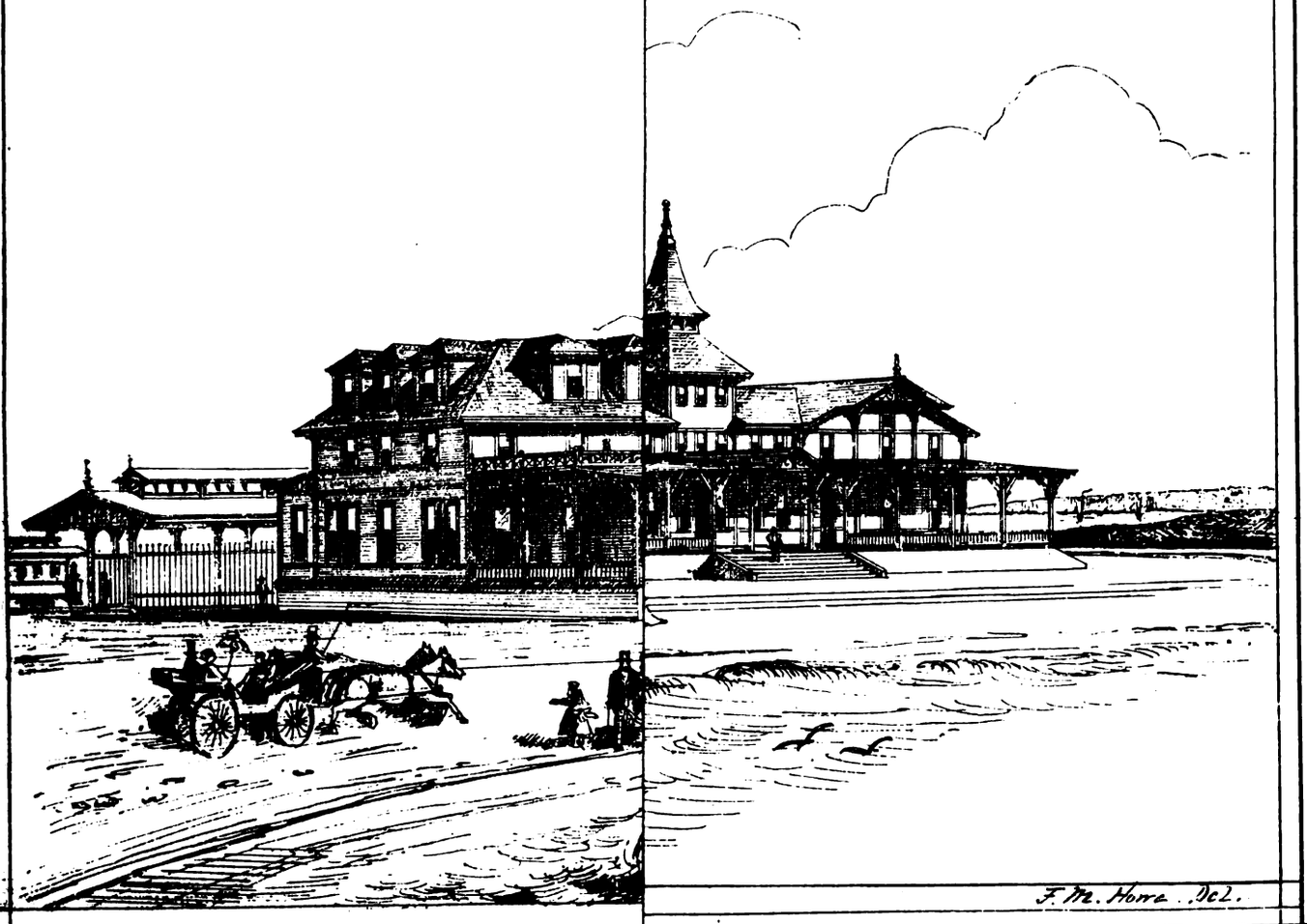
BEACH HOTEL.

M, ARCHITECT, BOSTON.





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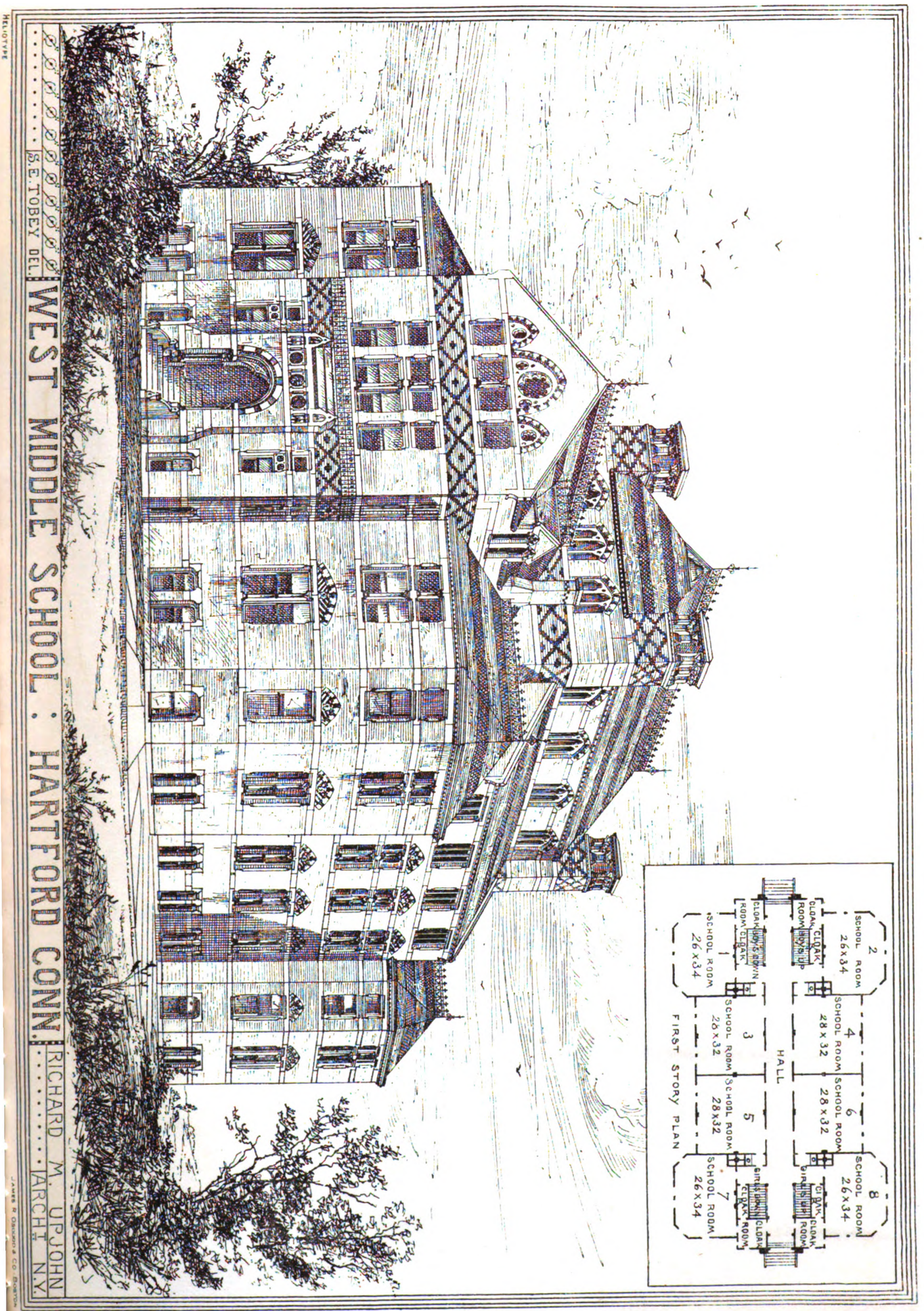

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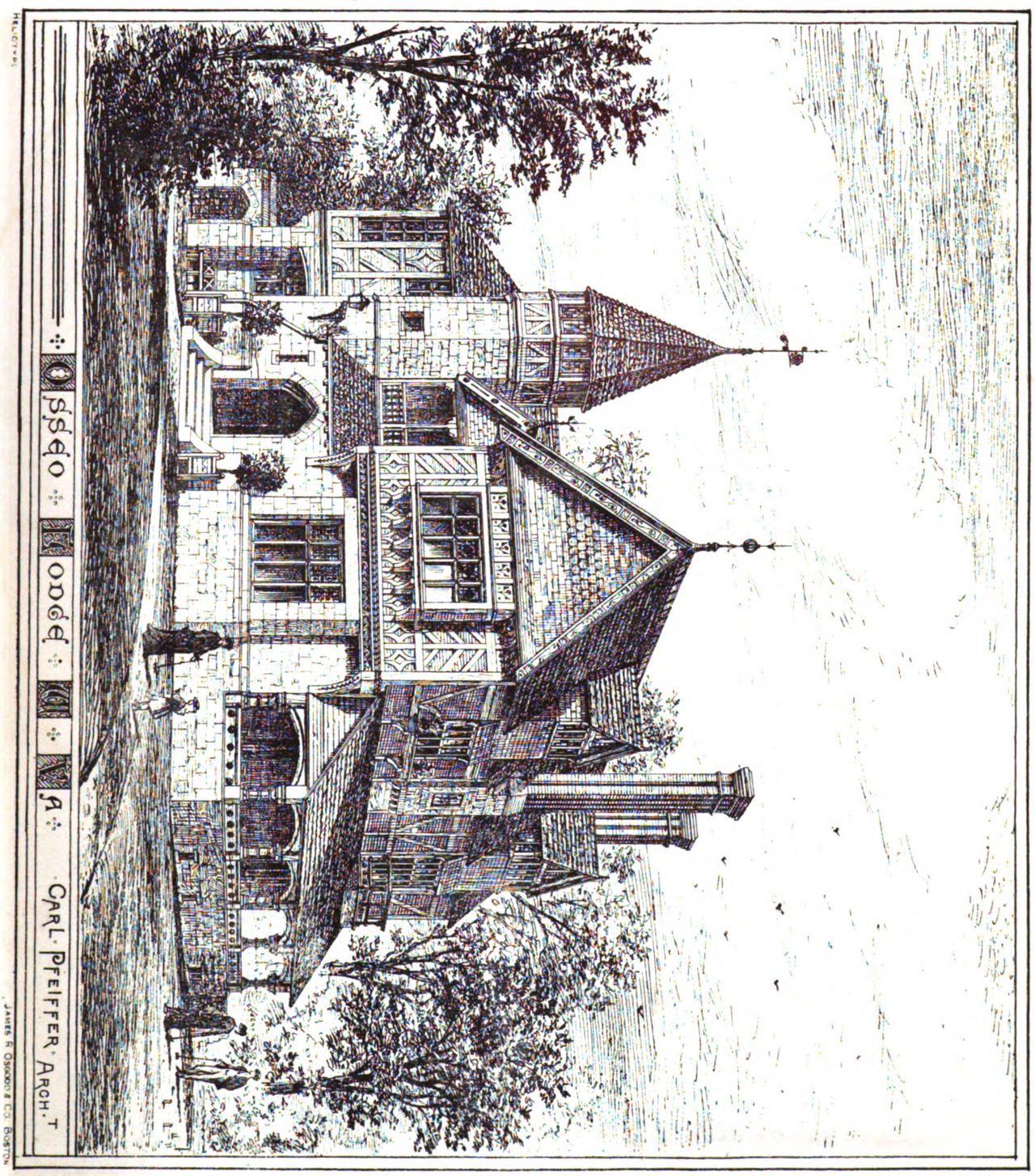

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, JUNE 9, 1877.

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BY an unlucky accident the editorial comment on the verdict of the coroner's jury for the Rockford Court House disaster, which we had prepared for our last number, did not get to press with the paper, owing perhaps to the hurry occasioned by the interposition of "Decoration Day," and the loss was not discovered in time to supply its place. The matter is too important to be passed without any comment, and we therefore recall here what we intended to say last week. The coroner's verdict declares that the architect "through neglect to provide for the great amount of weight called for to complete the building according to his plans is guilty of the deaths of the deceased; that the Board of Supervisors failed to use necessary caution in examining the plans and specifications, and acted unwisely in not employing a competent architect to superintend its construction." It is right that technical responsibility should rest on an architect who plans a building insecurely. The first enforcement of such responsibility must needs bear hardly on one who was probably not more careless than many others who escape it; but the public safety requires it. What the legal consequences will be remains to be seen. It would be hard to confine to the architect a pecuniary responsibility which the contractor by the terms of his contract directly assumed. And when it comes to actual culpability, if the architect is guilty for his want of proper caution in planning a hazardous structure, what is to be said of the superintendent, who being one of the Board of Supervisors, took the task of overseeing the work instead of the architect, and who seems to have left the contractor to put in what bad work and material he chose without interference or control — knowing but little of brick-work, as he testified? or what of the contractor, who believing all along, as he asserts, that the building was too slight to stand, deliberately run up his hasty piers of bad brick-work in defiance of the specified requirements, and built them smaller than the plans he criticised? The superintendent has quietly effaced himself. The contractor is in hiding behind the architect. The coroner's jury has put itself on record by making the architect the scape-goat, and screening the contractor in a verdict to which, while it is technically correct, it is difficult to ascribe any better motive than cowardice.

SINCE we wrote the above, Mr. Gay has published a long letter to the Chicago *Tribune* in his own justification. We shall give it, or as much of it as we find room for, in another column. He recounts the facts, which are already well known, that the piers which gave way were built smaller than he planned them, and that the material and workmanship were bad, which faults were enough to make them fall. He accuses the coroner's jury of being under the control of Richardson the contractor, and condemns their verdict as partisan. He maintains that if the piers had been built as they were designed they would have borne their load, and he holds himself justified. With Mr. Gay's accusations against Mr. Richardson's personal conduct we have no concern. The work on the court-house was no doubt criminally bad; on that and the coroner's verdict we have given our opinion. In Mr. Gay's letter we note two things: first, that he acknowledges no fault whatever; second, that he does not claim to have made any preliminary computations of the strength of his piers.

BUT to plan such piers without computing their strength was itself, in our judgment, a serious fault; and since Mr. Gay does not refer to any computation we must infer that they were designed by rule of thumb, that is, by just the method for which careful architects are in the habit of condemning, and justly, the "practical men" who attempt difficult or venturesome constructions without knowledge. Mr. Gay does not admit that his piers as planned were too weak; but computation has shown that according to the rules supplied by the best authorities, by which all prudent and skilful constructors consider themselves bound, although they might have stood, they were decidedly too weak to be safely trusted with the weight that was likely to be put on them. Mr. Gay quotes the sentence from the report of the experts: "That had the provisions of the plans and specifications been complied with, the margin that exists between safe load and ultimate strength is such as to render it probable that failure would not have occurred" (*occurred as it did*, says the report), and he thinks that it relieves him from blame. It does not relieve him from blame. A greater blame belongs to the contractor who failed to perform his agreement, and built what everybody knows to be bad work; but the architect is not relieved from blame who deliberately trespasses far within the margin which by consent of capable constructors is allowed for security's sake; nor is he who negligently wanders within it when he ought to carefully determine it. Doubtless when the excitement of a painful controversy is past Mr. Gay will realize that he did make a serious mistake, and that such a mistake entitles him to blame, no matter how much more culpable others may be than he. An architect in whom an error has led to grave consequences is entitled to some future confidence on the ground that to a conscientious man such a lesson will be a safeguard for the rest of his life. If a disaster like that at Rockford does not arouse an architect to search out his faults, what is his promise for the future?

AMONG the various projects which have been brought forward for finishing off the Washington Monument at its present height, that of Mr. Larkin J. Mead has attracted some attention. He proposes to place upon it a bronze statue of Washington seventy-five feet high, chamfering the top of the monument down to such a size as would display the statue. We know nothing of the excellence of Mr. Mead's design as sculpture, for we have not seen any drawing of it, and can only give it such tributary respect as is due to his reputation. But the project is not one to inspire confidence. The monument is even now too commanding a structure to appear to advantage as the simple pedestal of a statue however great. The idea of a frustum of an obelisk one hundred and seventy-five feet high chamfered at the top into a stand for a statue seventy-five feet high does not commend itself. The question of the utilization of the monument, if it is to be utilized, is a very difficult one, and ought to command the best powers of the men who are best used to the handling of architectural masses. Since the days of the Renaissance, when sculptors and architects were the same men, sculptors have not succeeded single-handed in the treatment of monumental masses large enough to have an architectural significance, any more than architects have in designing sculpture as adjunct to their buildings. In countries where these things are best understood, they are in the habit of associating themselves with architects in such projects.

A WEEK ago we noticed the death of Sir Digby Wyatt, which had been announced by telegraph. We have now to mention the death, which we find recorded in the English papers, of another noted English architect, not so well known for his own buildings, but a still greater loss to the profession at this time, since he died in the midst of valuable work. Mr. Edmund Sharpe, F.R.I.B.A., died of a sudden illness, in Milan, on the 8th of May. He was not far from

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seventy years old, having been born in 1809, but had retained his active efficiency in a degree that promised years of good service yet to come. He was one of the not large number of architects who had taken a university course, having graduated at St. John's College, Cambridge, in 1832. Winning a "travelling bachelorship," he was led to choose architecture as the study of his travels by Dr. Whewell, whose interest in the subject is well known. Returning from his three years tour, he studied architecture with Mr. Rickman, and afterwards began practice in Lancaster, where he spent twenty years of his life. Here he practised a number of years, building many churches which bear the marks of his assiduous study of early Gothic architecture. He was far too enterprising to be a merely archæological architect, and was one of the first and most active of his profession in England in introducing the use of terra-cotta. He built, we believe, the first English churches of which it was the material. His activity and versatility were manifested in a variety of ways. He was a capable musician, and invented certain musical instruments. He was more than once mayor of Lancaster, and was efficient in supplying the town with water-works and with improved sewerage. He was also concerned in the construction of several railways in England and on the Continent. After some fifteen years of practice, having a comfortable fortune, he gave up business as an architect, and devoted himself to the scholarship of his profession, studying his favorite Gothic, and publishing the works upon it which have made him famous. In 1875 he received the Royal gold medal from the Institute.

MR. SHARPE'S most important book, the "Architectural Parallels," a comparison, in two volumes of folio plates, of the abbey churches of Yorkshire, was published before he gave up practice, and quickly gave him reputation. He was an enthusiastic student of monastic architecture, in which he became the first authority in England. He gave especial study to the architecture of the Cistercian branch of the Benedictines, and to the transition period. Concerning these he published several works: "Cistercian Architecture," "The Ornamentation of the Transitional Period of British Architecture," and "The Ornamentation of the Transitional Period in Central Germany." At the time of his death he was occupied with two works, "The Mouldings of Six Periods of British Architecture," and "Illustrated Papers on Church Architecture." He was busy, we are told, in collecting material for this last work, which embodied the fruit of his ripe study, when he took the cold that shortened his life. We have just seen the publication of the third part of it announced: it is a grievous disappointment to those who were following him in it that he should not have been able to finish it. It is to be hoped that he left his material in such condition that it may be used in continuation of the work. Mr. Sharpe was a skilful draughtsman in pen and ink, and boasted of having been the first to introduce that method among English architects. He had however no skill in color, and this fact is doubtless to be connected with his dislike of the free use of color in mediæval architecture, and with his admiration for the architecture of the Cistercians, who prohibited it. During the last half-dozen years he had done great service to the younger architects of England by setting on foot the annual expeditions of the Architectural Association, which he guided through various interesting regions of France and England with equal success and profit, and of which the reports are probably more or less familiar to our readers through the English architectural journals.

THE controversies concerning the lost arms of the famous Venus of Milo will be renewed by the discovery which is announced of two arms within a few feet of the spot where the statue was found in 1820. Gen. Read, the American *chargé d'affaires* at Athens, sends word that two arms have been found, of which "the workmanship and the locality compel even the sceptical to admit the authenticity." One of them "holds a kind of disk or shield," — a mirror, it has been suggested, as becomes the goddess. They will be sent to the Museum of the Louvre at Paris, where the statue is; and there is a fair probability that if they really belong to it their adaptation will make itself clear. The fact that the statue was made of separate pieces of marble fitted together with dowels makes it perhaps more likely than it would otherwise be that the arms should have been detached without being greatly injured. Certain fragments, however, a hand and part of an arm which were found with the statue, had convinced some of the French archæologists that the goddess held the apple of Paris in her left hand, and that her right held her drapery, which has slipped down to her waist, — a conviction that must be given up if the new-found arms are authenticated. It would be a thing for artists to rejoice over if it should prove that the means really existed for the full restoration of the noblest of Greek Venuses; but the mere finding of these arms does not give any great promise, for even the fragments which were dug up beside her were enough to show that the remains of one or more other female figures had been buried with her. The material of the statue itself is likely to disclaim relationship with the arms of any other, being, it is said, a coralline marble peculiar in grain and color. Antiquaries have been disposed to identify it with the corallitic marble found in Asia and described by Pliny as resembling ivory in color and found only in small pieces, — *mensuræ non ultra bina cubita*, — a fact which might account for the way in which the statue is built up.

CHOICE AMONG ARCHITECTS.

WE took occasion last week in speaking of the complaints that prevail of late in newspapers concerning bad buildings and bad architects, to argue that the people of the country were at fault in that they really did not desire good building. The question remains how much they want good architects, and how they show their desire for them.

It might be expected that in a community which really cared to have as good architectural work as possible, the best architects would be most in demand, that the people would take pains to know how to distinguish good architects from bad or indifferent, that those who did their work most faithfully and capably would have the most to do, and that at least in the case of important works, most of all in government positions, the greatest pains would be taken to select architects who had the best possible training and experience, and to take advantage of the indications that are given by a commanding position in the profession.

But how is it? Most public work, and private work of exceptional importance, is assigned in competitions. It sometimes happens that these competitions are limited to a selected few who are known or accepted as capable practitioners, but more commonly they are open to whoever will enter them. The first thing is to get as many designs as possible from anybody who can be induced to offer one, it being assumed apparently that whoever offers a design is a capable person to carry it out. It would be a comparatively easy thing to get a good architect if that were the object, as one would suppose it might be, by simply selecting one whose standing was above criticism. The aim, however, is to choose not an architect but a design, which is a difficult and delicate matter, and one which requires the same kind of training that it does to make one. Nevertheless any building-committee considers itself amply capable of making this delicate choice, and all reasonably shrewd business men are thought fit for such committees. Architects are the only class of men who are habitually omitted as if incompetent to serve; and it is seldom, although it sometimes occurs, that any counsel is taken with them in deciding upon the designs that are offered. All the competitors must stand on the same footing, or else the competition is unfair. Now though an architect of training can judge pretty well from a design of the capability of the maker of it, an ordinary committee cannot; and so it follows that the competent and the incompetent have an equal chance of taking the fancy of the committee by some lucky device. The thing works badly in two ways. On the one hand the committee is likely to be captivated by an impracticable plan, or by some happy hit of an incapable designer. On the other the architects know the weakness of committees, and cannot in the nature of things respect their judgment. If they are of the better kind they either abstain from the competition, or, regarding it as a lottery, are apt to send in designs studied with too little care; if they are unscrupulous they know how to win favor of the committees by tricks which have nothing to do with the excellence of their work,

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and to these profitable tricks their labor is given. The natural result is that competitions have by no means proved themselves efficient means for securing capable architects, and that the success of them in this respect seems to depend mainly on the judgment that is shown in choosing who shall take part in them. In other words, as they are managed, it is not to the competitions that whatever success is attained is to be ascribed, but to something else. As for the character of government appointments, it is enough to say that there are few instances in which such appointments have been given of late years to architects who held any distinguished position in their profession. The appointees have either been obscure men chosen for reasons of personal association, or young men whose position was yet to be attained, as if the care of the public buildings of the country were a charge which could be sufficiently well borne by any man of capacity — which doubtless is the view that has been held by the appointers, — and not a duty of exceptional importance and difficulty, for which it was worth while to secure absolutely the best ability that could be commanded.

All business men are given to bargaining; but if the importance of an architect's function were generally recognized, it is hardly to be believed that we should see the constant effort that we do to beat down the established rate of fees. It may be said that this indicates rather want of faith in the individuals than want of knowledge of the exigencies of the profession; but our point is the little care that men show to get the best that are to be had, and their readiness to take up with practitioners of a lower grade for the sake of paying a less fee than the recognized one — a thing that it is hardly possible that they would do if they really considered the duty to be performed a very important one. Though the maximum compensation assigned by usage for all an architect's service is five per cent, or without superintendence three and a half per cent, it is extremely common for a client who would not hesitate to pay much more liberally for a visible addition to his building to grudge this three and a half per cent for all the skill and labor in designing that makes the building serviceable to him. So little does he appreciate this skill and labor that he is often willing to let a difference in charges of one per cent or one-half per cent of cost — a difference which he would think trivial in comparing the merits of two existing buildings if he were purchasing — determine his choice between architects, without regard to the qualifications on which the whole success or failure of his building will depend. There could hardly be a more distinct disparagement of professional standing and skill than in allowing this paltry and utterly irrelevant difference of fees to stand in the way of the consideration of the essential capability of the architects between whom a client makes his choice. We need not stop to inquire how much of this is due to the impression that an architect's best attainments are really of very little consequence, and how much to the belief that any client is quite competent to judge, criticise, and amend his architect's work. Both ideas are doubtless influential, and both are equally disparaging.

Let us note one or two instances. In the case of the Rockford Court House an agreement was made with the architect that he should be paid a little more than one per cent on the cost of the building for all the architectural work except the superintendence, which was taken out of his hands. We have no means of knowing whether any such arrangement entered into the decision of the architects' competition, nor does it signify. It appears sufficiently that the building commissioners were satisfied with the choice of a plan that they liked, and a trivial saving of money in the architect's commission, and thought the rest unworthy of consideration. Again, not long ago a scheme was set on foot for building a great music hall in Cincinnati. The scheme was a noble one, grander in scale than any of the kind that had been undertaken in the country; it deserved and needed the most careful study and the best professional ability that could be secured for it. Several architects were selected and invited to furnish designs for the hall, but the competition presently degenerated into an auction, and the work was intrusted to the architectural firm which offered to do it for the smallest fee, viz., for fifteen hundred dollars, or about one-half per cent on the lowest probable estimate of the cost. It is not to our present purpose to speak of the discreditable and suicidal character of such a policy on the part of architects: its significance as a gauge of the committee's earnestness in trying to get the best professional aid is obvious. And now the Legislature of Indiana, in issuing orders for a competition or for an unlimited number of competitions for their new State House, have ordered that all the competing architects shall compete in the matter of fees as well as designs.

It would be useless to enter into the many considerations that influence the distribution of private patronage. It is enough to remind our readers that much the greater part of the work is given to architects who work for very small fees, and give, as is natural, very little service in return, and who in capability and acquirement stand near the bottom of their profession. A yet more significant fact is that with a few notable exceptions, the architects who make the largest incomes are not, as is the case in the older professions, those who have the highest training and the best experience, who stand first among their professional brothers; but those who do their work rapidly and cheaply and therefore with little study. This is discouraging enough to architects who wish to do as good work as possible, and who set due value on professional training. There is further discouragement in the discredit with which people are apt to meet the best professional advice when it is set before them. Architects and engineers are but too familiar with the obstinacy of clients who set up their own opinion, or uphold against them the advice of "practical men," that is, rule of thumb and guess-work, in cases where common experience is not to the point, and where theoretical training is the only guide. The citizens of Rockford are said to point to their disaster as a proof that "theoretical architects" are of no use. The trouble at Rockford was that the architect was not theoretical enough, and that the contractor, who appears to have had every thing his own way, was too practical. It was the practical president of the Lake Shore Line who displaced the theoretical engineer of the Ashtabula bridge, and built it according to his own lights, so that in due time it tumbled into the river. And the clamor is still heard for completing the Washington Monument according to the advice of "practical builders," after it has been condemned by the highest authority among the engineers of the army.

The encouragement, then, which the public offers to technical proficiency among architects is slender. If the ranks of the profession offer a refuge for pretenders, if these pretenders prosper, and climb into high places which should be reserved for their betters, it is not to be wondered at. Mr. Emerson quotes in one of his essays the saying of a manufacturer concerning some objectionable iron, that "if there were cinders in the iron, it was because there were cinders in the pay; there was always good iron to be had." We advise men and committees who have important buildings in charge to take some special care that they secure a really well-trained and capable architect, to pay him properly, and to trust him, distrusting their own fancy for this or that taking project; and then to hold him to as strict account as they will. If it is true, as we have said more than once, that where there is no responsibility there is no security, it is equally true that there should be no responsibility where there is no authority. But it is worth while to consider carefully on whom authority shall be conferred.

STUDIES OF INTERIOR DECORATION.

X.

CONCERNING FURNITURE.

THE conscious and professed application of principles to architecture and to the concomitant arts of design has been the peculiar characteristic of the English people since the new reformation under the leadership of Pugin and Ruskin in the first half of the century, and more especially since the comparisons of the first international exhibition awoke the nation to a realization of its artistic inferiority. The excellence of truthfulness and sincerity was the dogma of the fruitful movement. This characteristic had its birth in the revival of Gothic architecture; to a great extent it may be said to have caused that revival; but now that it has taken root in the artistic consciousness of the English people, it seems likely more or less directly to have a prevailing influence on all their better work, whether they use mediæval or classic forms, or whether these forms are applied to architecture, furniture, wall-hangings, draperies, stuffs of all sorts, pottery, needle-work, or carpets.

Following immediately upon this newly aroused sensitiveness as

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to the essential relationships existing between constructive and decorative forms, between the processes of manufacture and their artistic results, has come some idea as to the value of color as an essential part of design. Color and form, it is discovered, belong together, and must be considered together. The subordinating of positive to neutral colors, the conventionalizing of natural forms, the avoidance of the imitation of shadows, flat decorations for flat surfaces, — all these peculiarities of treatment are found to be necessary to the production of effects in art.

In short, we have before our eyes the spectacle of a great people, who in our own time, finding themselves outstripped by their neighbors in the arts of decoration, and learning that to the highest success in these arts there is needed a certain basis of principle, have proceeded from this discovery with an energy born of a high sense of duty, have gradually unfolded one by one the secrets of art, and finally have taken their assured place side by side with the most inspired of modern nations.

This advance has been exhibited in the designing and manufacture of furniture, as well as in all the other arts of industry.

On the other hand, the styles of furniture belonging to the successive eras of the French Renaissance from the time of Philibert de l'Orme to the present day, which, by reason of their supreme taste, their luxury, and their infinite variety, have reigned and do still reign supreme in the dealers' warehouses and in the modern drawing-room, betray no consciousness of the necessity of professing principles of any sort. Such principles as they have are not moral forces affecting the whole form, but mechanical traditions belonging to the cabinet-makers' shops alone. Among the French designers and manufacturers, it is not, as with the English, duty painfully learned and seriously followed, that conducts them to successful results, but a natural artistic aptitude or taste, kept from vagaries and vulgarity by traditions of good workmanship, and above all purified and corrected by that *academic discipline* which for nearly four centuries has rigidly confined the abounding genius and invention of France to expression in classic types alone. Into whatever extravagance of line the era of Louis Quinze (the Rococo) may have led the French designers, they could never be vulgar. Even the wild undulation of surface, such as is seen in some old bureaus and cabinets, which in the hands of Flemish cabinet-makers, or in England in the time of George I. and II., were simply barbarous, seemed, under the correction of scholastic restraint in France, to be merely a sort of joyful exuberance which we may regard as a curiosity of genius.

The best qualities of modern English furniture are therefore to be attributed to a conscientious regard for principles; those of French furniture, to an enormous fertility of invention restrained by the discipline of the schools.

The increase of wealth and the ostentation of it at home and abroad, have created a very great demand for fine furniture, which the trade has been prompt to meet with all the cheap devices of imitation. Hitherto France has supplied the models almost exclusively. Machine-work, glue, veneering, French polish, infinite reduplications have been the servants of this ministration; and the result has of course been that show of tawdry splendor, that effervescence of "shaping," twisting and vulgar carving, against which the late moral crusade has struggled with a flattering promise of success. In this process of popularizing fine furniture, the models which have inspired the familiar forms such as we see in the barbarous bedsteads and the "parlor suits" of the period, have been infinitely travestied, caricatured, and vulgarized, until their original good qualities have become well-nigh overlaid with the work of coarse pretence.

The natural result of the license of the Cavaliers was the narrow formalism and rigidity of the Roundheads. So the vulgar exorbitance of the modern cabinet-makers has been followed by an application somewhat too severe of the principles of truth of construction; and, as we have had occasion to observe, a limitation of invention to a certain range of forms and details in the Neo-Gothic or "Eastlake style," the *motifs* for which have been taken from the furniture-accessories of some illuminated missals, from a few mouldering chests in the muniment-rooms of cathedrals, and from certain ancient chairs and tables of rustic workmanship which have somehow been preserved for us through the vicissitudes of time and chance. From its incapacity of various expression, this new development of forms is now evidently exhausting itself. Indeed, it has already been delivered up to the Philistines, and the style, although born and baptized in honesty, now often exhibits shams as flagrant as any which debased the styles which it undertakes to supplant. Thus a tenon passing through a mortise-hole and pinned on the other side with a practicable peg is one of the accepted traits of moral cabinet-work; but when we see this end of a tenon with its peg all glued on separately as a show, the hypocrisy tempts one to turn back to the old régime with the feeling that there at least we are not so likely to be betrayed.

It is therefore with a certain sense of relief that we behold accompanying the revival of the English architecture of the seventeenth century (the Stuart period), and of the beginning of the eighteenth century (that of Queen Anne), a corresponding revival of the forms of furniture which were peculiar to those epochs. The characteristics of this furniture were freedom of outline, classic orders treated without subservience to rules of proportion, small mouldings often highly enriched, baluster-posts with the central member frequently swollen to huge proportions, twisted legs, mimic balustrades, broken entablatures, square and interlacing panels, round drops and finials, and the arabesques and caryatic grotesques inherited from the Elizabethan period. The chairs allow such curves in their legs and arms as are essential to grace and comfort; they are light or heavy as circumstances may require. Most of these characteristics are welcome contributions to our resources of design, and if used with discretion are not inconsistent with the essential requisites of constructive truth. They permit a greater play of imagination without necessary offence of extravagance, and are amenable to every sound principle of design without loss of any desirable peculiarity of expression.

This is all that can be required by the interests of art in any furniture. Furniture is not to be treated with the same reserve and the same self-denial as architecture. Neither, on the other hand, will the refinement and knowledge of the present day admit the grotesque conceits and rude license of form which characterized the dressers, chimney-pieces, and screens of Crewe Hall, Kenilworth or Raglan Castle, Speke Hall in Lancashire, Haddon Hall in Derbyshire, and other buildings of the English Renaissance.

It cannot be too often repeated, not only as regards furniture, but as regards architecture itself, that we are not to consider sound principles of design as confined to any particular style. We must distrust exclusions, for we are by inheritance eclectic, and there is something sound, good, and applicable for use in the work of every era. Neither are we to disturb ourselves lest we commit an anachronism in any design. In this respect we have outgrown the dogmas that cramped our fathers. The virtue of the designer, whatever *motifs* he chooses, even in allowing Gothic and classic in the same composition, is so to combine them that they shall not be incongruous, and so select and treat them that they shall not be extravagant. It is beneath the dignity of an artist to hold himself subservient to a fashion inaugurated and maintained simply for the sake of change. The style in which the designer should choose to work should be controlled by the conditions of his problem alone. The furniture of a room is an essential part of its completion for use; and all the styles of all the past ages are equally ready to yield their suggestions to him, and aid his invention in obtaining the expression of perfect fitness.

Thus the chimney-piece and sideboard in Plate VII. were composed, not with the object of faithfully interpreting a certain style, but to meet certain especial conditions of structure and situation, as heretofore described, with such *motifs* and details of design as seemed most capable of meeting the immediate emergency. The composition is certainly not *correct* as a reproduction of the work of any one era; but it may suggest to the intelligent mind how precedents may be unconsciously borrowed from various works of four centuries,— mediæval and Renaissance, English and French, and even from Japan, so as to do fair service together in the expression of an architectural idea of the nineteenth.

In Plate VIII. we give a sketch of a cabinet of late French sixteenth-century work in the Kensington Museum, beautifully composed and executed, and sumptuously enriched with delicately studied architectural details of the period. Side by side we present a faithful translation of it into modern English Gothic, preserving the same dimensions, the same distribution of parts, and the same degree of richness. This parallel may serve to show among other things, that, with the resources of design at the command of the modern architect, the same idea is capable of very various expressions; that the choice of style is not merely a whim of fashion, but a privilege to be cherished for the sake of the grateful enlargement it offers to the language of art; that to exclude the Renaissance expression on the one hand, or the Gothic expression on the other, would be a gratuitous surrender of our heritage, not required by any principle or dogma of art deserving to be recognized by the designer.

THE ILLUSTRATIONS.

HOUSE FOR I. I. DEWEY, QUECHEE, VT. STEPHEN C. EARLE, ARCHITECT.

(9 Pemberton Square, Boston, Mass.)

THIS house is built upon a broad, level plateau or natural terrace about one hundred feet above the Quechee River, and within a few rods of the Quechee Gulf, a very picturesque chasm of some note. The building is of wood, of an unusual mode of construction. The walls, partitions, and floors are made solid by continuously spiking boards together, making a very stiff and warm building, and one much less susceptible to atmospheric changes than those made in the ordinary way. It is also thought to be nearly fire-proof and quite rat-proof, there being no flues or spaces in the walls, floors, and partitions, to assist in spreading flames or to harbor vermin. It has the further advantage of deadening sound quite as well as the ordinary methods employed for that purpose. Native hard woods have been used throughout in the finish, that of the hall being black walnut, parlors cherry, sitting-room birch, dining-room oak, and second story ash. Hard wood floors of simple designs have also been laid in the hall and

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living-rooms. The house has all the conveniences of the best city dwellings, including excellent aqueduct water, gas, elevator, and steam-heating. The arrangement of the latter was specially planned by the proprietor. There is no fire in the house, but the steam is carried in underground pipes from the mill about five hundred feet distant, under a pressure of sixty pounds per square inch; but by means of a regulator it is circulated in the house at a low pressure of from one to five pounds as may be desired.

DESIGN FOR A CHURCH AT NORTHAMPTON, MASS. MR. E. T. POTTER, ARCHITECT.

(Newport, R.I.)

This design was submitted in close competition some months ago. It was proposed to build it of undressed stone, with brick belts, quoins, etc.

MUSEE À GRENOBLE, NEAR PARIS, FRANCE. M. CH. QUESTEL, ARCHITECT.

We reproduce this design from an etching in the *Encyclopédie d'Architecture.*

STUDIES OF INTERIOR DECORATION. PLATE VIII.

See the article above.

IRON-WORK, ANCIENT AND MODERN.

THE smith's art may be traced back to prehistoric times, and was always deemed of the greatest importance; so much so that conquerors were wont to remove these artisans from vanquished nations, to prevent the forging of swords and spears.

Homer tells us that in the games instituted in honor of Patroclus, Achilles proposed a ball of iron as one of the prizes to be contended for. Herodotus mentions a saucer of iron, very curiously inlaid, that was presented by a king of Lydia to the Delphic Oracle; and adds that "it is of surprising workmanship, and as worthy of observation as any of the offerings preserved at Delphi." Few specimens of iron-work have been met with among the remains of Egypt: this by some has been attributed to the nitrous nature of the soil, which causes rapid corrosion. It would appear from several objects found among the ruins of Nineveh by Mr. Layard, that the Assyrians were accustomed to overlay iron with bronze when they wished to give their works greater grace and beauty, being unable or unwilling to give pleasing and elegant forms to iron alone. But it was the Middle Ages, that period of wonderful activity and gradual shaping of the states of Europe, that gave an impetus to the work of the smith, carrying his art to an eminence that it had never attained before and which has never since been reached.

In the twelfth and thirteenth centuries, when cathedrals and minsters were beginning to rear their lofty choirs above their humble surroundings, the Church, ever the patroness of the arts, called in the aid of the smith to assist in the decoration of her sanctuaries. Then metal-work was rapidly developed, and it soon reached great refinement of style and execution. To these centuries belong the best works in wrought metal. Then the smith's art was a noble one, and with full freedom in design and wealth of imagination, he forged such works as decorate the doors of the great cathedrals. His screens, grills, canopies, hinges, etc., were perfectly adapted to their purpose; their very quaintness and the angularity of their curves show that they were beaten into shape around the beak of an anvil, and were left with all the marks and indentations of the workman's hammer. Unfortunately, when this high position had been attained, the attempt was made to overlay the simple design with architectural forms, instead of leaving it with the bold simplicity which had marked its development. To do this, the smith's work had to be overlaid and partly hidden by casting the figures and ornamentation. From that time the decline was rapid. The anvil and hammer gradually fell into disuse, and were supplanted by the crucible and ladle.

Ancient Gothic iron-work, unless in the form of locks, hinges, or such small matters, is extremely rare. Few classes of old architectural decoration have suffered more severely; and considering the beauty of the remaining examples, the loss is to be deplored. In the Norman period the iron bands and hinges were extremely simple; generally variations of the straight bar across the door, with a second bar bent into the form of a horse-shoe on the hanging side. This, when securely bolted, gave the door great strength and solidity. How readily we recall the light grills, or the wondrous strength and delicacy combined in the hinges of the decorated period; the graceful forms and lightness of chandeliers and coronas ornamented with hammered leaves!

The observing traveller will pause to examine the hinges of Notre Dame at Paris, the well of Quintin Matsys at Antwerp, the gates of Luneburg Town Hall, St. Ursula at Cologne, the screens around the tombs of Queen Eleanor and Henry V., and many other examples of the application of true principles and taste to the manipulation of this material. Mechlin contains some curious iron-work in hinges, locks, knockers, etc., some of them of Spanish origin; their scroll work, pyramidal points, and other features, reminding one strongly of Elizabethan work.

In the fifteenth and sixteenth centuries, the city of Nuremberg became the great centre of literature and the arts. The trade of the East passed through Venice to Nuremberg, and thence to the West of Europe, along with her own productions in iron, brass, and precious metals. The spirit of the citizens was in advance of the age, and rapidly developed the production of books, musical instruments, household furniture, earthenware, hand embroidery, and art metal-work.

"Nürnberg's Band
Geht durch alle Land,"

was then their proud and popular proverb, and the multitude and variety of their manufactures warranted them in claiming their pre-eminence. The metal-work wrought in this city is justly celebrated for the beauty of its design, and the care and patience bestowed upon it. The Schöne Brunnen, erected between 1355 and 1361 by Schonhofer, is a remarkable specimen; and there yet remain many other productions by the same master, who, like other craftsmen of his time, worked in stone or metal, and with equal success. About two centuries after the completion of the Schöne Brunnen it was surrounded by a high railing wrought by Paul Köhn, who invented a device which greatly pleased the citizens of Nuremberg. In the transverse bars he inserted loose iron rings, a treatment which could only be adopted in welded metal, and which was unanimously declared to be the sign of Nuremberg workmanship. Peter Vischer, who with his five sons wrought the shrine of St. Sebald, was so greatly esteemed that whenever a prince or potentate came to Nuremberg he seldom left without visiting his foundery. His great work, the shrine of St. Sebald, still stands in all its beauty in the church dedicated to that saint. The architectural portion of this shrine, which is of bronze, displays the characteristics of Renaissance art ingrafted upon mediæval forms by the subtle skill of the workman, who seems to have been deeply imbued with the spirit of Italian design; the latter school being apparent throughout the entire composition. Thirteen years were spent by Vischer in its execution, for which he received seven hundred and seventy florins, a poor recompense for so much skill and labor. He has himself recorded in an inscription on the shrine that "he completed it for the praise of God Almighty alone and the honor of St. Sebald, Prince of Heaven, by the aid of pious persons, paid by their voluntary contributions." At the western end is a small statue of Vischer himself in workman's dress, with chisels in his hands, standing "unaffectedly forth as a true, honest laborer, appealing only to such sympathies as are justly due to one who labored so lovingly and so well."

Favorite subjects for ornamentation among the smiths of the Gothic period and also during the Renaissance were locks, which exhibit great diversity of form and delicacy in execution. Modern locks need no ornamentation, for there is no opportunity to display work of that description save on the face, which is narrow and comes where ornamentation is not looked for, and where it would be out of place. Much attention is, however, given to the design of knobs and escutcheons, which are frequently of bronze and covered with scrolls, basket-work, heads, and other devices. But though costly, they lack the spirit of mediæval work. We feel that they are machine made, and that there are hundreds of the same pattern. They are marked by a degree of nicety, an exactitude and a precision in the lay-out of the pattern, without the little variations that are incidental to hand-work. Whatever we have gained in the manufacture of our lock furniture, we are infinitely below the standard of the old metal-workers in giving expression to these details of our dwellings. In those days the lock was not mortised into the door as we now insert it, but was made so as to display a broad and elaborately wrought plate enriched with coronets, fleur-de-lis, and quaint animals twisted into almost inconceivable forms; often plain, with tracery formed of thin plates of metal, pierced and applied one above another until the desired effect was obtained, sometimes covering the whole surface with a wild exuberance of detail, particularly in the Renaissance, where wreaths of flowers, acorns, and oak-leaves intertwine and hide the lock-plate, forming a background for masks and heads in high relief, designed and hammered out of steel with patience and a regard to the effect of the minutest detail. The men who executed works of this kind were above the average craftsmen; they were in fact art-workmen on a par with men like Grinling Gibbons, whose wood-carvings delight the eyes of all who behold them. Keys were made no less attractive, for their handles were usually enriched with tracery, and the wards were formed into pleasing devices.

The locksmiths retained their skill and freedom in design to a much later period than the other smiths, and even at the present day we find among them men who are able to execute good works with the hammer. Viollet-le-Duc thus speaks of the present state of the locksmith's art: "The locksmiths in the country have kept up the use of the forge; and the forge is the whole of iron-work. In the large towns, on the other hand, they have been taken with a rage for casting and founding, and workmen on buildings have become unaccustomed to the minute work of the forge. They are no longer any thing but adjusters."

The smiths were united in guilds which fostered a love for art, and assisted each individual member when necessity required it. Unlike the modern trade-unions, their aim was to elevate and raise the workman to a higher standard of excellence; and hence they de-

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veloped a spirit of honest rivalry and *esprit de corps* lacking at the present day. Thus we find Adam Kraft in his old age accustomed to rely on the assistance of his brethren Peter Vischer and Sebastian Cindenast, a coppersmith, to aid him both in the design and execution of his works. If these records were wanting, the similarity of works executed at the same period of time, in widely separated districts, would point to this interchange of ideas. M. Daly, in his *Revue Générale de l'Architecture*, mentions a grating in the Church of St. Germer, in the *Département de l'Oise*, and a similar one in the Cathedral of Strasbourg, both of the forms adopted in the twelfth century, as proofs of this assertion. The construction of these gratings is very simple, — upright bars of iron filled in with thin metal in the form of volutes, constantly repeated, the ends flattened out into an imitation of the palm-branch, the whole being securely fastened together with pins and ornamental bands.

In England the Company of the Smiths or Blacksmiths was incorporated in the twentieth year of Queen Elizabeth's reign; and as far down as the reign of Queen Anne and the Georges we find good examples of wrought-iron work, as represented in gates, grills, and other details of utility and ornament.

The early colonists in America, appreciating the work of the smith, brought to this country many specimens of his skill; and at the present day we sometimes meet with a tall gate with all the peculiarities of the times of Queen Anne and the Jacobite. A gate of this description, once owned by Abraham Redwood, after frequent narrow escapes from the melting-pot, has at last found its proper place as the north entrance to the Redwood Library, at Newport, R.I., and lends to that venerable edifice an additional dignity.

Having now briefly glanced at iron-work and its enrichments, it becomes a question how far we have availed ourselves of the many advantages it offers. The smiths of the Middle Ages had a limited field for the exercise of their skill: with the exception of a few large works such as *flèches* and the tracery of spires, their efforts were confined to the forging and enrichment of minor details. Within the last fifty years a new system of construction has sprung up, particularly in this country, i.e., the erection of whole blocks of city buildings entirely of iron, a material well adapted to the purpose, and in skilful hands calculated to insure the great desiderata of lightness, strength, and beauty. The heavier portions of these buildings, with the exception of beams, girders, and some other details, are, and probably ever will be, of cast iron, which seems most suitable for this purpose. It is, however, a source of regret that the spirit of design has not kept pace with the rapidly increasing use of this material. We see at intervals a building constructed of iron, in which some attempt has been made to secure a true rendering of the parts by honestly avowing the material employed. Such a building is an oasis in a desert of long rows of Ionic and Corinthian columns, — order piled on order and proportioned after the rules of classic art, or rather as that art has been translated by Palladio and Vignola.

We pass a city store of five stories, each a separate order, modelled with scrupulous care after the rules laid down by the authors of the Renaissance. From a distance its proportions and apparent solidity please us: by chance we strike a column with our cane, and it gives the sonorous ring of metal. It is hollow: iron does not need to be solid, and the metal has been saved; but our sense of the fitness of things is jarred, and the building at once loses in our eyes its claim to stability and truth. This might be remedied. Why not design an iron building so that every part shall speak of its function and material? Let a pier say that it is of iron and hollow, that it is fastened to its lintel with bolts and screws, and make the latter aid in giving emphasis to the whole. The hammer and anvil might well be revived to fashion many of its details, and the use of sheet-metal festoons, wreaths, and masks would become a thing of the past. Iron requires painting to prevent corrosion; that is no sham; but in this effort to preserve the material, there is no reason why we should imitate the veining of marble, or sand it to deceive us with the belief that it is stone.

A writer in the *Westminster Review*, in describing this false use of iron, says the result is "therefore to exhibit iron in the light of a decidedly inferior material for ornamental purposes; and yet the slightest consideration of the innate qualities of iron and the vast variety of ornamental purposes to which it is constantly applied, from grand and massive interstitial gates and screens to the lace-like transparent brooches and ear-rings of the *bijouterie* of Berlin, must render obvious the real superiority and vastly extended powers of this material for purposes of ornament."

The argument constantly advanced by metal-workers that people cannot afford to pay for ornamental stone-work, and therefore must have the same amount of decoration in a cheaper material, is the enunciation of a principle far too prevalent at the present day and which does great injury to true architecture, by placing every thing on the ground of great show for little money. If this principle were to be followed out, the architect might soon descend to the position assigned him by Prof. Huxley, and devote his time to designing wreaths and capitals, which being cast *ad libitum* might be scattered through the land and adapted to all descriptions of buildings.

The last twenty years have seen in Europe a great improvement in metal-work, which has to a certain extent been revived in the restoration of cathedrals and other mediæval buildings, and the growing desire for a better and truer spirit in architectural design. The architects in this country in their turn have felt the great need of a better state of things, and in many cases have set to work manfully to insure it. G. C. M., JUN.

CORRESPONDENCE.

THE THOMAS GARDEN CONCERT HALL. — NEW CHURCHES. — THE TRINITY CHURCH REREDOS.

NEW YORK.

THE Thomas Garden Concert Company (limited) offers the latest novelty in the line of proposed buildings. To cover a whole New York block with a single building is a great scheme: yet this is what Mr. Alfred H. Thorp, the architect of the new palace, proposes to do. The old Hippodrome at Twenty-sixth Street and Madison Avenue, opposite the Union League Club House, and touching upon the north-east angle of Madison Square, is to be torn away; and in its stead an iron and glass structure including on the first floor over a hundred little shops in the manner of a bazaar, on the floors above a great garden 200 feet square and about 90 feet high, a concert-hall or parquette, and three balconies, restaurants, smaller hall for cabinet music and piano recitals, alcoves within and without, promenades, and all at a cost of not more than $500,000. The shop story or ground floor, arcade is to be 23 feet in the clear. For eight feet from the floor, the partitions between the shops will be of cement blocks built from column to column; above this to a height of 13 feet, ribbed glass partitions will be continued, and a glass ceiling will be placed over each shop. This will leave a clear air space for lighting and ventilation of eight or ten feet up to the floor of the garden and auditorium above. In the aisles of the concert room glass tiles will be laid transmitting a light *vid* the great dome light above. In these several ways Mr. Thorp is convinced that the arcade shops will have abundant light and air. The design provides for the smallest amount of added decoration: what grace can be secured by massing and the arrangement of parts will be aimed at, but no money is to be spent in beautifying the structure. Sketch plans have been prepared, to give the public some idea of what may be expected, and with these the commissioners of the company are busy getting subscriptions. They profess entire satisfaction at the progress already made, and ultimately hope to throw open the doors to the 10,000 persons it is to accommodate. At present the whole plan is in too incipient a state to give any very definite information.

The two most important churches at present going up here are the Roman Catholic churches of St. Paul at Ninth Avenue and Fifty-ninth Street, and that of St. Francis Xavier on Sixteenth Street between Fifth and Sixth Avenues. Both are of the nature of enlargements, to take the place of present structures found to be too small for the accommodation of growing congregations. St. Paul's is by a Newark architect and is well advanced, and will when completed stand next to the cathedral in point of size. The new church of St. Francis Xavier will stand next the present structure, where, it will be remembered, the fatal panic rush occurred several months ago. Mr. Keely of Brooklyn is the designer. The position occupied requires merely a dressed front, the sides being hidden by adjoining houses. The complete structure will cost alone $200,000, but during the present year work will not be carried beyond the foundations.

The Jauncey Court work is assuming form, and the two architects promise to put up a couple of attractive structures, views of which I hope to provide shortly.

The choicest new thing, architecturally, we have now is the Trinity reredos, over which Mr. Withers is exercising a most careful supervision. He is sure that nothing finer in stone-carving can be shown in mediæval work, while the bas-relief work is most exquisitely modelled. The undercutting on the foliage work, and the clean style of the crockets, pinnacles, ball-flowers, angles, and other details is especially noticeable. The statuettes have not yet been placed in position, nor will they be until the renovation of the interior of the old Trinity has been completed. The stucco-work of the nave and aisle vaulting will be cleaned, and the whole interior of the chancel has been decorated in polychrome, emphasizing the wall panels. The floor of the chancel is to be laid in tile, and the choir stalls are said to be most richly and carefully designed specimens of artistic wood-work. In a few days the work will be thrown open for private view to a number of invited guests.

THE ROCKFORD COURT HOUSE.

CHICAGO, June 2.

SINCE the rendition of the verdict of the coroner's jury, nothing definite has been done in relation to the ruined Court House. No attempt has been made to prosecute Mr. Gay or any one else concerned. There is a general expression of sympathy for Mr. Gay both here and in Rockford, due to the prevailing opinion that he has been made the scapegoat for others who are more criminally responsible for the disaster.

On Monday last, the Board of Supervisors of Winnebago County

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held a special meeting to consider what should be done. Mr. Duncan Ferguson, president of the Board, who is also chairman of the building-committee, and mayor of Rockford, opened the proceedings with an explanatory address. The building-committee met on the same day. Mr. Gay, the architect, and Mr. Richardson, the contractor, both appeared before it. On the following day, the building-committee presented to the full Board a communication from Mr. Gay, to the effect that he offered to superintend the building until completion, devoting half his time to it, for the sum of $1,500 in addition to the fees already agreed upon, and to make all necessary additional drawings for proposed modifications without expense. He also proposed to associate with himself some architect of high standing who might be acceptable to the Board, as consulting architect.

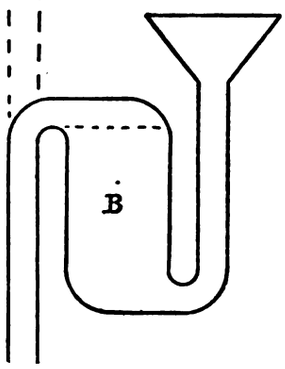
The proposition was rejected, and it was determined to procure plans (from whom not mentioned) of modifications in the structure, and appoint three architects, two from Winnebago County, and one from without. The Board then adjourned to meet Tuesday, June 5. It is understood that Mr. Gay is preparing modified plans to submit at that time. To-day, in a communication to the Chicago *Tribune*, he makes an appeal to the public for simple justice and a fair hearing.

TRAPS.

CHICAGO, May 4, 1877.

EDITOR AMERICAN ARCHITECT.

Dear Sir, — A correspondent of yours inquires for a trap that cannot be "siphoned out." The ordinary S trap will prevent this if made as shown in the accompanying sketch, the middle part marked B being made much larger in diameter than the other parts. The reason for this will be apparent on inspection, and need not be dwelt on.



I cannot agree with the statement that ventilation of waste-pipes will not prevent siphoning out. If the ventilating pipes are properly placed, as indicated by the dotted lines, siphoning out need not be feared if they are, as they should be, the full size of the waste-pipes.

Respectfully,
JAMES R. WILLETT.

CORRECTION.

EDITOR AMERICAN ARCHITECT.

In your number of May 26, in a description of "the illustrations," it is stated that the design of Messrs. Roberts and Taylor for a receiving-vault for Mount Pleasant Cemetery at Newark was "remodelled and erected at a cost of $2,680." This is incorrect. The receiving-vault was competed for by several architects; the design of Messrs. Roberts and Taylor was with others rejected by the committee; and that of Mr. Jonathan O. Nichols adopted, and was erected by him at a cost of $4,775.

TRUTH AND JUSTICE.

MR. GAY IN HIS OWN DEFENCE.

CHICAGO, June 1.

To the Editor of the Chicago Tribune: —

As I am the architect who drew the plans of the Rockford Court House, I wish to make the following statement. When public excitement runs high over a calamity such as happened at this building, it is almost useless to ask for a calm and fair view, and the press too often increases the furor for the sake of the sensation. I asked the public once before to stay judgment on the disaster until an examination of the cause could be had. Such an examination has been held, and the coroner's jury unjustly threw the blame on me. I want to discuss the facts as briefly as possible, and explain the causes that led to this partisan verdict. I drew the plans for a certain sum, and was not employed to superintend at all. A local superintendent, Mr. Latham, and a building-committee took charge of the actual work. I went to Rockford, when called, to estimate the amount of work executed, in order that the contractor, Mr. Richardson, might draw his pay *pro rata*. Except an exceedingly short inspection from time to time, therefore, I never knew how the work was done, and could only judge from external appearance. Such a structure requires the daily attendance of a supervising expert. Infinite details arise demanding care and judgment, and the contractor must be watched constantly, to see that he does actually comply with the plans and specifications. The only blame I now attach to myself is that of allowing the lives of workmen and my character as an architect to be intrusted to the tender mercy of persons who, doubtless honest, might be, and as actually proved in this case were, entirely incompetent to supervise and carry out my plans. Work of this character cannot be intrusted to many. There should be one competent and responsible head.

The four sides of the central pavilion were of stone and brick, and barely twenty feet high; and the two inner corners rested on columns of iron, and these columns rested on brick walls widened into piers. This wall or succession of piers gave way, and the pavilion fell inward, carrying all before it. The exterior walls are perfect and solid. The real important question therefore hinges simply on the sufficiency of these piers. They were figured on the plans as two feet ten and five-eighths inches wide, with bearing-stones and iron plates on top for the iron columns, and bond-stones throughout the piers from bottom to top. These piers were reduced in width by the contractor six inches, and also further reduced by the contractor by cutting into them about six inches to form a skewback for the vault arches; that is, twelve inches, or more than one-third of the strength of the pier as planned, did not exist. Particular specifications accompanied the plans for this work, calling for the hardest-burned brick well soaked with water; and these bricks should be laid in the most careful and particular manner. Many of the bricks used were so soft that they can be easily cut like chalk, and were only sprinkled, not thoroughly soaked. This was very important, as these soft bricks are peculiarly porous and absorb a great deal of water. The mortar was a pretty fair quality, but most miserably laid, the joints being from three-fourths to one and one-fourth inches thick by actual measurement, and the bed-joints very irregular. The interior of the walls and piers contained bats and very soft brick, sufficient to condemn the piers for ordinary purposes. Fair specimens of the brick with mortar adhering can be seen at Mortimer & Tappen's office, 95 Washington Street. I examined a few brick before the work began, and passed upon some as hard-burned and sufficient, and condemned others. This I did with the local superintendent, but of course I could not decide generally during the progress of the work, not being there nor called there.

I never examined the walls to any extent, and was not called to do so. Much of the defective part was entirely invisible when finished; errors in it could only be determined by a daily and hourly supervision. It was the business of the local superintendent to make this daily and constant examination, and insist upon the contractor complying with the plans and specifications. I could not do so. I only saw the work at all at intervals of from two weeks to three months, and then was only there for a few hours.

The specifications called for bond-stones to be laid throughout all interior walls wherever necessary, and there should have been from seventy-five to one hundred of them. I cannot now find one. There should have been many bearing-stones also; there are less than a dozen, all told. The heavy work overhead which fell, and was built within the last three months, I never saw at all. Mr. Richardson built this much heavier, for some reason, and not in accordance with my directions. This extra and useless weight contributed doubtless largely to the crushing of the wall. To sum up, then, the support I had provided was cut down over one-third, and built of wretched brick in a poor way, without any bond-stones, and loaded beyond my intention.

Each one of these allegations is an absolute fact, and cannot be denied, and the short-hand report of the evidence shows it. Is it any wonder that it gave way?

If it had been built right, would it have stood the strain? Every expert who testified before the coroner's jury swore that if the support had been well built, of full size, and of good materials, it would have endured a great deal more, and this testimony also can be found in the short-hand report; and any person interested can easily calculate how much a good brick wall nearly three feet thick, as I had provided, will bear. Mr. Boyington has mentioned brick piers in Chicago carrying weights many times in excess of that imposed on the Rockford piers. What I now say is simply incontrovertible, and, rejecting many unimportant matters, relieves me entirely from the blame in the minds of all fair men.

Yet the Rockford verdict places most of the fault upon me, and a great cry went up there and elsewhere to indict me for manslaughter. Whence does this manifest unfairness arise? I will briefly explain that also. Mr. Richardson, the contractor, is an exceedingly able man, an active politician, and exerts influence all over the country. He resides at Springfield, the political centre of the State, is the contractor for the Illinois State House, Indiana State Prison, etc.; and his power and influence compared to mine are as a thousand to one. He was on the building at the time of the accident, and displayed consummate coolness and self-possession then and thereafter. At Rockford he has a powerful party of friends, relatives, and financial backers, who are interested in his success, and cannot let him fail. Within an hour or so after the casualty he had the coroner's jury organized, and every thing possible done to shield himself from the consequences legal and financial. From the outset the papers not unnaturally made me the cause, and the Chicago *Tribune* in particular seemed open only to statements favorable to Richardson and prejudicial to me. The *Tribune* even sneered at a brief note I sent requesting a suspension of public opinion till examination. When the hearing before the jury began, I soon found I was prejudged, and that Richardson was all-powerful. If the county bore the probable damages he would be relieved; but this, of course, implied crushing me, and nothing has been left undone to bring this about. The outside pressure on this jury was simply terrible, and the fair men on it were unable to resist it. A much more severe verdict was drawn up, which was modified to the mild one (?) sent to the public. Butterworth, their chief spokesman, exhibited the greatest partisan indecency, and actually insulted Messrs. Bauer, Boyington, and others, by asking if they were paid to come out there to clear Gay. Again it was said, when testimony favorable to me was introduced, "We want no more of this sort of testimony. We want to know who killed these eight men. We want evidence that these plans are defective." And again, "These experts from Chicago have sworn to a pack of lies." Now, every architect who testified before that jury is my business rival, — men whose interests are absolutely opposed to mine, and I have had competition with some of them almost bitter. Outside of their unquestioned integrity, they have no interest to falsify for me. Their almost unanimous conclusion that the walls and piers were sufficient if correctly built should have been

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conclusive with that jury, and is to-day outside of it, in the mind of every fair and unprejudiced man. Yet the jury disregarding all the evidence, the sworn opinions of Messrs. Boyington, Bauer, Willett, Cleveland, Bauman, Tapper, Gen. Smith, Burling, and Wight, find me to blame. Messrs. Wight and Burling were not examined beyond their report made with Gen. Smith, but in this report they state, "That had the provisions of the plans and specifications been complied with, the margin that exists between safe load and ultimate strength is such as to render it probable that the failure would not have occurred." This is from the short-hand report. This is the most severe statement made against me by the experts, and made too at a time when the demand upon them was to most carefully decide amid the excitement of the inquiry into the cause of the disaster; and this is about all the outside testimony worthy of much attention, and it relieves me from blame.

I furnished to this jury all the information in my power. I have distorted and concealed nothing. For eleven days I struggled with this overwhelming current alone, with few friends, and most of those overawed, with no capital in the building to bring me friends and adherents, and little or no assistance from any source. But it was useless. I might as well have staid away altogether. The verdict ignores the testimony, and clears the man who is really responsible legally and morally. It gives me pleasure to say that I find now there are many people who are not governed by the rules, and do not believe in "crowner's 'quest law" as laid down by the Rockford jury, who can reason and think for themselves. As excitement and passion die away, reason will resume her sway, and the large jury of the public will locate the blame where it belongs.

I feel that I have not been fairly used, so far. The verdict of this jury attempts to throw a cloud on my professional character, and leaves me no redress. I shall not sink under the blow, however, and am confident that time and other juries possibly may reverse the present judgment.

Very truly,

HENRY L. GAY, *Architect.*

NOTES AND CLIPPINGS.

THE WASHINGTON MONUMENT. — The Washington Monument Society has adopted a report disagreeing with the Board of Engineers as to the stability of the foundation for the monument, and asserting that the commission fell into error from the adoption of erroneous data.

COSTLY DWELLING HOUSES. — The San Francisco *Chronicle* corrects the extravagant stories about the cost of certain residences recently built in that city. That of Mr. Crocker cost about $400,000, instead of $2,500,000; that of Mr. Hopkins, $500,000, and that of Mr. Stanford, $450,000.

THE BRICKMAKERS' STRIKE. — We have not, during the last few days, seen any mention of the strike at the brick-yards on the Hudson; and we therefore presume that this, the most demonstrative of the recent strikes, is as much of a *fiasco* as the various engineers' strikes throughout the country. A few years ago, a strike accompanied by so much violence would have been laid at the doors of the then much dreaded and semi-mythical International; but to-day we hear no hint of its being an organized movement of dissatisfied labor against capital. The presence of the militia to the number of eighty, with 950 rounds of ammunition, seems to have been sufficient to put an end to active violence. A few arrests have been made, but the sentences have been so light as to give rise to the accusation that the leniency shown by the judges was caused by their desire for re-election to office.

THE LEE MARBLE QUARRIES. — Owing to the neglect or refusal of the Philadelphia city government to make an appropriation for continuing the work upon the Public Buildings now erecting in that city, it is feared the operations will have to be suspended at the marble-quarries in Lee, Mass., whence the stone for building is obtained. This will throw nearly 100 men with families out of employment.

TORNADO IN ILLINOIS. — On the evening of June 4, the town of Mount Carmel, Ill., was partially destroyed by a tornado. Over a hundred buildings were destroyed, including the court-house, two schoolhouses, and three churches, the steeple of one of which was carried three hundred feet in a direction opposite to the general course of the storm, showing that it was probably a true cyclone. As was likely to happen at such a time of night, the ruins took fire from lamps and stoves, and added to the damage and probably to the loss of life, which has not been small.

AN ELEVATED CONSERVATORY. — The plan which has often been suggested of turning the tops of houses in cities into gardens has been carried out by the Palmer House in Chicago; and a portion of the roof of that hotel is now covered with a large conservatory. The structure is entirely of glass and iron. A fine collection of tropical and rare plants has been provided, and the regular heating apparatus of the house supplies ample warmth.

A MONOLITHIC SARCOPHAGUS. — A sarcophagus, cut from a block about ten feet in length and four feet in width and thickness, is being constructed at the sand-blast factory at West Rutland for a soldiers' cemetery at Cold Harbor, Va., where are interred the remains of one thousand soldiers whose names are unknown. The work will cost $2,000.

FIRE BRICK. — An exchange states that iron is a dangerous ingredient in fire-brick. When a brick containing iron is exposed, even at a low temperature, to gases containing carbon, part of the carbon is deposited near the iron. This has often not only caused the brick to lose its cohesion, but may even burst it so as to throw down the iron wall of furnaces and the lining of flues.

ST. WERBURGH'S TOWER. — It has at length been decided that the tower of St. Werburgh's Church, Bristol, England, shall not remain on its present site. It is to be transferred to what is to be a new church of the same name, in the suburbs of Bristol.

CLEOPATRA'S NEEDLE. — For some time past it has looked as if the English were not to be allowed to remove the Khedive's gift to the Victoria Embankment because of the opposition of the person upon whose land it lies. Perhaps, as much as any thing else, it was the declaration of this Mr. Dimitrio that the obelisk should no longer cumber his ground, and his declared intention of cutting it up into building-stone, that led to the movement in England and the acceptance of Mr. Dixon's proposition for its removal. But no sooner is there a chance of having his land freed from its encumbrance than with amusing inconsistency Mr. Dimitrio declares that he cannot part with it, and to protect his rights surrounds it with a palisade; but expresses his willingness to forego his claim in consideration of a heavy indemnity. But after several interviews with the Englishmen who have gone out to arrange for its shipment, he has withdrawn his opposition on the condition that he, Mr. Dimitrio, shall be considered the donor of the monument. This has been readily conceded to him; and it now remains to be seen whether the authorities will consider it a legitimate trick played upon an overreaching native, or whether Mr. Dimitrio's name will actually appear upon the monument with that of the Khedive as joint donor.

A MONUMENT TO DICKENS. — The printers of Portsmouth, England, having under consideration a project to erect a monument to the late Charles Dickens in his native town, an application was made to the Queen for her patronage. Her Majesty declined the request, stating that she has never assisted in the erection of a memorial to any person. The printers thereupon determined to abandon the scheme.

A FRANCO-SPANISH TUNNEL. — About the 1st of January, 1878, a railroad tunnel through the Pyrenees will probably be opened to traffic. It has taken several years in building. It will now do away with the twelve hours tedious diligence-riding between Perpignan and Barcelona.

BURNING OF THE CATHEDRAL OF METZ. — The fire in the cathedral of Metz, which was occasioned by illuminations in honor of the presence of the Emperor William on May 7, did a serious damage to the building. The interior of the roof was nearly wholly destroyed, and much of the stonework and sculpture of the interior was damaged by the fall of burning beams. Fortunately the clock was uninjured, and the great bell, which is called *La Muette*, and, like the great bell of Notre Dame at Paris, only sounds on the most solemn occasions, and which with the tongue weighs over twelve and one-half tons, did not fall as was momentarily expected. The cathedral, which was begun in the year 1000, is 395 feet 8 inches in length, and 143 feet in height.

A FRENCH BUILDING ACCIDENT. — It is consolatory in these times of mortifying building-mishaps in this country, to learn that other countries are not wholly free from them. A portion of the church at Vatan (Indre), France, in process of construction, gave way, causing the fall of a centre some 36 feet in length, and of three masons who were at work upon it. It is gratifying, too, to contrast the invective in which the editors of our daily papers indulge themselves, with the simple remark that "It is thought that the persistent bad weather had softened the mortar, and so had induced the fall." The fixing of the culpability, if any, was left to the jury.

THE POWER OF THE ELECTRICITY OF THE BODY. — In view of recent disastrous discharges of exploders in the Sutro Tunnel, some interesting experiments were instituted by Mr. Sutro with a view of ascertaining the cause, and more especially to determine whether the electricity of the body might not have, in this high altitude, something to do with it. Electric exploders made by different persons were placed in a strong wooden box, which again was placed in another box in Mr. Sutro's parlor. This room is covered with a heavy Brussels carpet, walking over which causes the human body to be speedily charged with electricity. Mr. Hancock, the chief blaster, assisted in the experiments, and held the wires while Mr. Sutro walked round the room two or three times with slippers, sliding his feet gently over the carpet. After doing this, he approached the end of one of the wires with his forefinger, and instantly a loud report was heard, the exploder having been discharged. This first experiment was with one of the San Francisco Giant Powder Company's exploders. Then one of the Electrical Construction Company's was tried, without effecting its discharge. Next one of George M. Mowbray's of North Adams, Mass., was used, which did not go off on the first trial, but did on the second with a very loud report. After this another of the giant exploders was tried, which went off by the time Mr. Sutro's forefinger had reached within two or three inches from the end of the wire. These experiments have clearly established the fact that exploders may be set off by electricity accumulated in the human body, and the men about the tunnel were at once informed of the fact. Instructions were also issued for handling them hereafter, and a sheet-iron plate was placed in the floor of the exploder-house, to which is connected a wire reaching into the water flowing from the tunnel. The men in handling exploders now stand on this iron plate, and have instructions to wet their boots before entering, and to put on India-rubber gloves before touching the exploders. If these precautions are properly carried out, there will be no danger of explosions hereafter. Any electricity accumulated in the human body will at once be carried off through the iron plate, while the rubber gloves, being non-conductors, form an additional protection. No accidents from these explosions have ever occurred inside the tunnel, for the place is very wet and therefore no electricity can be retained in the body. — *Virginia City (Nve.) Enterprise.*

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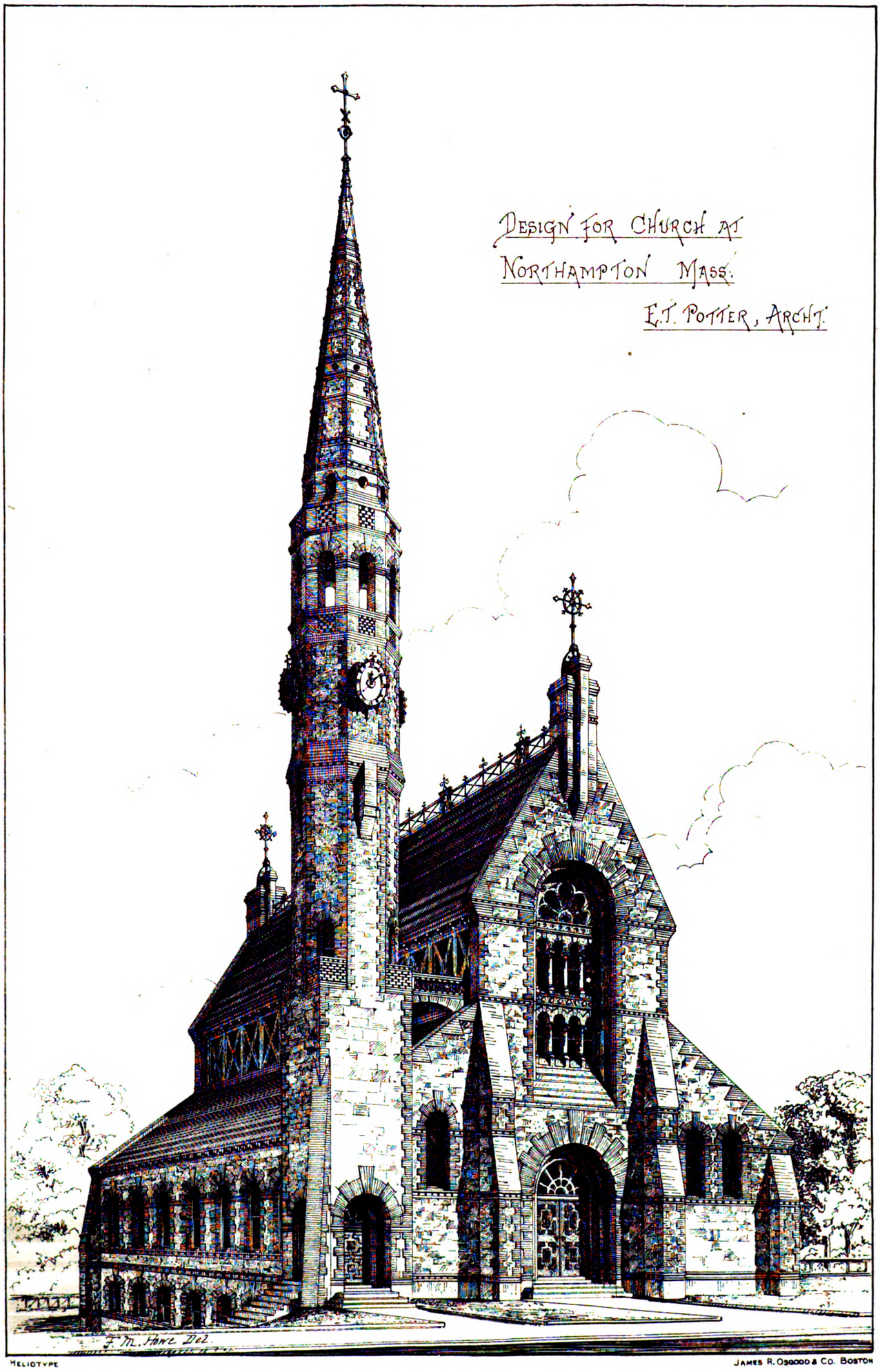

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STUDIES OF INTERIOR DECORATION. II. PLATE VIII.

Parallel of Renaissance of 16th Century & 13th Gothic.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, JUNE 16, 1877.

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THE last story of damage from bad building comes from Bridgeport, Conn., — at least, the latest at the time we write. A large and high building occupied as a hat factory was burned there a few days ago. One end of it was extended into a one-story addition, which was used as the counting-room or office; and while a dozen friendly volunteers were occupied in trying to rescue the safe and furniture of this office, the wall of the main factory fell upon it, and crushed them. The building was nearly three hundred feet long, fifty feet wide, with four stories and an attic, and the walls only twelve inches thick above the basement. Here then was a huge structure, built for manufacturing uses and to hold machinery, with walls fifty feet high, and carrying four floors, but no thicker than those of a common dwelling-house. More than half their substance was cut away, for the windows were four feet wide, and the piers between them only three feet and four inches. Apparently they were not tied across in their three hundred feet of length, for it is reported that when the floors burned away they fell outward. It is noticeable that this was the case with all the walls, the end ones crushing the two adjoining buildings. The tendency to do this is in itself an argument for not leaving people to build what walls they choose, since it endangers the public without, as well as the occupiers or benefactors who may be within. It is perhaps more than the most sanguine can expect, that the smaller towns throughout the country should fortify themselves with adequate building-laws: in Ohio this has been provided for by State legislation. A special difficulty in the Bridgeport case was, that the water in the street mains was soon exhausted, and the engines had to draw what little water they could from pools and swamps. There were hose in the building, but no water could be got from them, it is said. The destructiveness of other serious fires in Bridgeport has been attributed to the same cause, — a bad look-out for a town which depends for its prosperity upon its manufactures. The verdict of the coroner's jury says "that the supply of water from the hydrants was totally inadequate for the occasion; *for, had it been sufficient, the fire department could have stopped the conflagration, and thereby prevented the falling of the brick wall* which caused the sad deaths." This placid assurance will be a great encouragement to the builders of thin walls, as well as to the Bridgeport fire department. It only remains for the protection of towns, that a satisfactory equation should be established between scarcity of brick and abundance of water.

THE efforts which have been making in several of our cities to improve the housing of the poor inhabitants are gradually bringing out good results. We have alluded more than once to the success which has attended the Philadelphia plan of small separate houses, which however is still, we believe, without its counterpart in any other of our large cities. The experiment undertaken in Brookline not long ago by Mr. White — of building a block of tenements for low rent, but substantially, with careful planning for light and ventilation, for privacy and decent living, and made secure by fire-proof halls and stairways — has thus far proved, it is said, entirely successful. The block covers four ordinary building-lots, and is said to have cost about thirty thousand dollars, to which is to be added seven thousand for the price of the land. It contains forty shops on the ground floor, and above them forty tenements, which are let at an average rate of seven dollars and a half per month. These tenements were in demand from the time when they were ready for use, many people coming out from New York to occupy them, and have all remained full. Although the rents are moderate even for tenement-houses, they are said to yield a return of twelve per cent, which after allowing five per cent for taxes, insurance, repairs, and care of the building, leaves the satisfactory net income of seven per cent. This answers the question which has been a bugbear to capitalists, whether such well-built houses can be made to pay with poor tenants. Nevertheless the profitableness of it is somewhat explained by the fact which is given, that thus far there have been absolutely no defaulting tenants. This of course is exceptional, and implies that the building has attracted a better class of tenants than the average.

THE last annual report of the Boston Co-operative Building Society, which has lately been rendered, also gives some encouraging information. The society has tried a variety of experiments, with a variety of results. The most instructive part of its record is the comparison of its success in the new tenement-houses which it has built and its non-success in trying to redeem an old and disreputable one. Its new tenement-houses have proved fairly remunerative, paying a dividend of six or seven per cent, besides covering some losses on other investments, until the last year, when one-half the dividend was omitted. The tenement-house which the company tried to redeem was a miserable hive on Lincoln Street, surnamed in derision the Crystal Palace, of the worst reputation and construction; the tenements crowded upon long dark corridors and narrow stairs, with a nest of dirty privies, sleeping-rooms shut off from light and air, and a grog-shop in the building. It was a filthy haunt of the vicious poor. The company took the building on a five-years' lease, cleaned and repaired it, closed the lodging-rooms in the cellar, built wells for light and air, and did what could be done to improve it. For the first two years it was found that this also was profitable, but hard times brought the tenants into arrears. An effort to improve the character of the lodgers by sending away the bad ones proved still more unremunerative. It was found impossible to secure the kind of tenants that the company wished; the old stigma that had attached to the building could not be cleansed away. The lease began to prove a losing investment, and when it expired it was not renewed.

THE Boston Board of Trade held a special meeting last week to consider the question of education for industrial art, and appointed a committee to collect information and suggest action in its behalf. Mr. Walter Smith, State Director of Art Education, recounted his experience as an instructor, and recorded the progress of England from the time when at the exhibition of 1857 he found her occupying the lowest position in artistic manufacture, "with one exception, — the United States of America," up to the present time, when at the Centennial exhibition the English display surpassed all others in his opinion, and we believe in most persons'. He made a spirited appeal to the meeting to do away with the reproach that our people preferred foreign goods because there was not the necessary taste and skill in the country to make home goods of equal excellence, and that all our skilled workmen were imported; enforcing his appeal by the statement, which all Americans will hasten to accept, that our people are not inferior to any in natural fitness for artistic work. The value of the resolution and of the committee will depend on what follows from them; but the movement may indicate an interest from a new quarter in an undertaking which has been in hand for some time. Massachusetts, as is well known, has for several years been busy introducing into her schools the study of drawing for the uses of industrial art, under the direction of Mr. Smith, — a study which has thus far been prosecuted, it must be confessed, with rather more industry than art, but which has

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excited an interest and acquired a momentum that may in time be turned to profitable use. 'Hitherto the movement there and elsewhere in the country has been due altogether to the activity of a few public-spirited men who have stimulated legislation in its behalf. The astonishing influence of the movement in England has been owing to the fact that it was fostered by the leading manufacturers, who have there encouraged it, and relied upon it, and developed it into a system which if not without patent faults, has at least marvellously improved the standing of British manufacture throughout the world. In this country they have simply stood aloof from it. The busiest manufacturers have neglected the artistic factor in their work, in favor of rapidity of production and cheapness. The leading manufacturers of decorative work, themselves mostly foreigners, are content to rely on foreign workmen whom they import, and prefer rather to stand jealously apart than to join hands in a work of improvement which would, they fancy, raise up rivals for them. We are not of those who have any jealousy of the foreigners that come to this country to do good work: we are glad to welcome them, but we shall be still more glad when we see those who drive the industrial interests of our country diverting a little of their energy from the struggle for rapid production, and uniting in a common effort — which will also have its profitable effect on the balance-sheet — to improve the artistic quality of their work, a thing in which we are so conspicuously inferior to other nations of what we consider the same rank in the scale of civilization.

AMERICAN towns, like most modern towns, are apt to be unfortunate in their adaptation to the natural advantages of their sites. They have usually been laid out or grown up at hap-hazard and straggling, without concert between the men who built them, and with no general plan; or else have been roughly adapted to some special notion of convenience, perhaps nothing better than the right angles of the surveyor's compass. Even where attempts have been made to beautify them, it has been mostly by disconnected and arbitrary projects with no reference to any general scheme, or to suggestions offered by the peculiarities of the sites themselves. A special interest will attach to the scheme that is in hand for beautifying the pretty town of Williamstown, Mass., as perhaps the first instance in the country where a town already existing has been taken up with the purpose of making the most of its natural characteristics, and applying a decorative landscape treatment to the whole town. Not long ago, Mr. Cyrus W. Field, a graduate of Williams College (which gives its name to the town), gave ten thousand dollars for the improvement of the college grounds and the adjacent parts of the town; and the committee to whom he gave the matter in charge wisely put the planning of it into the hands of Mr. Frederic Law Olmsted. The town is a small one, of some four thousand inhabitants, and lies on prettily broken ground in the picturesque county of Berkshire. The houses are chiefly collected about the colleges, stretching for a mile along the main street of the village, which is two hundred feet wide, and planted with elms in the good old fashion. Mr. Olmsted has prepared a plan for bringing all this part of the town into a single scheme of decorative treatment, terracing and planting and turfing, and adapting the whole embellishment to the suggestions which the lay of the land naturally furnishes, as well as to the convenience of the inhabitants; taking away fences and hedges, damming up a convenient stream to form a lake and waterfall, and converting the whole into a continuous park. The people of Williamstown have pride in their town; and it would seem that they take this project for embellishing it in good part, and second it kindly.

To fix the site of the former city and oracle of Dodona which, under guardianship of Jupiter and Dione, was the most ancient oracle of Greece, has always been a difficult question for geographers, who have been on the whole disposed to put it at the end of the little lake Jannina in Albania, the Turkish province that covers the ancient Epirus. Quite lately a gentleman of Jannina, Mr. Carapanos, has set the question at rest, it is is believed, by discovering in the neighboring valley of Sarocovitza, what seem to be the veritable remains of the old town and sanctuary. On a small eminence which rises out of the valley were found the ruins of a citadel or acropolis, with distinct indications of the sanctuary of Jupiter, and a *peribolus* or sacred enclosure within which was a small temple of Aphrodite. The accounts which we find in different French journals do not altogether correspond; but it appears that the temple or sanctuary of Jupiter was of moderate size, some sixty-five by one hundred and thirty feet, comprising three different structures, in one of which were found a great number of votive offerings and inscriptions. The larger enclosure or *peribolus* also contained remains of two or three small buildings, one of which was shown by a votive inscription to have been dedicated to Aphrodite. The objects found in the ruins number eighteen hundred, mostly of bronze, copper, and lead, including tablets, bas-reliefs, inscriptions, sacred utensils, statuettes both of men and animals. Among them are some hundreds of coins, of which the latest are said to bear the date of Constantine. The acropolis was triangular or rather quadrantal, in shape, and surrounded by a wall of which one side was curved and furnished with seven towers. There was also a very large theatre, of which the remains are better preserved than most. It included forty-five ranges of seats; and under the stage was found a narrow chamber or well, thirty feet deep, for which it is difficult to assign a use.

AT the same time, Gen. Read, the United States *chargé d'affaires* at Athens, writes of the discovery at that city of a monument of much historical interest. Thucydides mentions the setting up of a monument by Pisistratus, the son of Hippias and grandson of the tyrant Pisistratus; and lately the secretary of the Archæological Society of Athens, Mr. Commanverdis, has discovered on the right bank of the Ilissus, and not far from the temple of Jupiter Olympus, a neglected stone which bears the inscription, —

"This monument, upon his advent to power, Pisistratus the son of Hippias has dedicated in the temple of the Pythian Apollo."

It is assumed that the position of the stone marks the situation of the temple of Apollo, which has hitherto been unknown.

THE QUALIFICATIONS OF ARCHITECTS.

WE have spoken of the little care taken by the public to choose good architects, and the little effort made by it to command a better kind of building than that which it has lately been condemning so loudly and with so much reason, and of which with less reason it has been disposed to ascribe the whole responsibility to the incapacity and carelessness of architects and builders. It remains for us now to revert to the real fault which so much bad building betokens in our profession.

After all, though it is clear to us that the standards of building in this country are as high as the people on the whole demand and are yet ready to pay for, this by no means absolves architects as a body from responsibility in the matter. They are in a sense the trustees of the building of the country. They are the confidential advisers of the men who build; it is from them that improvements in the methods of building have come for the most part, and are likely to come. Their influence, unless they lose it, is likely to tell very strongly, and will tell constantly, in favor of any standard of work which they choose to advocate, or against any which they reject. Where improvement is needed it is their business to lead the way. If there does not exist a demand for the best methods of building, it is theirs to create it; if the knowledge of them is lacking, it is theirs to promulgate it.

When we consider what are the qualifications of the profession as a whole for this work, we have to confess that we find it lacking. It is true that the public takes no great pains to encourage the best attainment in architects. But if the rank and file of the profession were what it should be and might be, they would not allow buildings to be put up under their direction, nor if they could help it from their designs, which were not securely and substantially built. The popular theory that an architect absolutely controls the manner in which his building shall be built is, we know, a fallacy. We know that he is in a majority of cases under pressure, and often subject to interference, which lead or

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compel him to slighter work than he would prefer; but if architects commonly knew, as the best-trained of them do, just what was safe and wise, and if it were their universal habit to protest against and resist inadequate construction, not only would the work in their charge be greatly improved, and with it the general standard raised, but we are convinced that their own consideration and the public appreciation of their importance would be increased.

As it is, we find that a considerable part of the profession really knows nothing of the theory of construction, nor of any methods but those that are in common use under their eyes; that their only rule in practice is the rule of thumb. A good many of them, especially outside of the larger and older cities, are simply builders who, being more enterprising or ambitious than their fellows, have elected to become architects. A good many others are young men who having served for some time as draughtsmen in one or more offices, and learned the usual run of work, often without having had any other responsibility than to do as they were told, or having spent a year or two in an architectural school, consider themselves fitted to begin practice as architects. Of the first of these classes there is not much to be said. They are already a less proportion than they once were, and they will become fewer still as the general level of the profession rises, and their want of acquirement marks them off more distinctly from regularly educated architects. The imperfect education of the practitioners who assume to be architects only is the serious difficulty. There are a great many busy offices in which nobody is to be found who has even a rudimentary knowledge of the principles of construction; in which every thing is done by the mere tradition of the shop as much as it is by the workmen themselves; in which no one would ever so much as think of computing the strains of a truss or the strength of a pillar or girder, or would even know how it could be done. This thing did little harm a generation ago, when all building was pretty much alike, and few difficult or unusual problems were met with, especially when the traditions of builders were in favor of solid work, and material and labor, being less in demand, were less sparingly used than they now are. Since then, besides the growing tendency to slight building, the introduction of a new and costly material, iron, has brought new problems in construction, and by making economy in its use peculiarly important, has brought also great temptations to be stingy of it. At the same time, shops, warehouses, and public buildings must be much larger and fit for much harder service than they were thirty years ago. The greater freedom in design of our day, and the adaptation of buildings to many new wants, have greatly changed our ways of planning them, and are continually pushing construction to feats and experiments that were unthought of before. It follows that the means of learning to which it was safe for architects to trust in our fathers' day are not at all safe in ours. Mere traditions of work and the experience of what commonly goes on are no longer a sufficient guide. The exigencies of the time require of an architect a careful theoretical study of principles and methods of construction. The kind of judgment that comes of handling material and watching work, and which amounts to what is popularly called "gumption," is not adequate to modern occasions any more than theoretical knowledge is enough without it. It is not necessary, to be sure, that an architect should have the skill that is required to design a railway suspension bridge, but he ought to be able to meet readily the kind of problems that are likely to occur in building practice, and to solve them with precision. He ought especially — and here should be the virtue of his training — to be on the watch for difficulties and dangers, and not pass them over negligently when they occur.

One needs for this a kind of knowledge which is not abstruse or difficult, but can hardly be acquired in the work of an office. It is exactly the kind of knowledge which, being purely theoretical, is not to be picked up or learned by practice, but must be studied in books or under personal instruction. Few architects have any time to give to personal instruction of the pupils in their offices, and those who have any are naturally inclined to devote the little they can give to more purely architectural teaching or the more continually useful details of ordinary work. The student, therefore, unless he studies the theory of construction at school, is left to work it out by study in extra hours; and few students are to be found who have the "grit" to do this with what is to most of them a dry and forbidding study, or even who sufficiently feel the need of it. The routine of office work will not supply it, for the results of one problem do not guide a learner to the next; and in practical work the occasions for computation are too irregular and infrequent to furnish the necessary schooling. It is in the technical schools that the remedy is to be found. All of them provide courses of construction, and such courses ought to be considered an essential part of the training of a capable architect. Unfortunately, although an architectural education includes a great deal of work, most learners wish to hurry through it in a very short time. The study of design naturally engages the student's chief attention during the little while which he allows for his technical schooling, and the subordinate but still essential studies of construction go to the wall. The courses in the schools are necessarily more or less eclectic, and it is not easy to say to a student who will give only one or two years to the work of three or four that he must take part of his short allowance of time from what are really the cardinal studies of his profession, and give it to what a large proportion of his fellows neglect entirely, and what are of comparatively rare use, however important they may be to a thorough education.

The real cause of the imperfect training of architects lies in the haste of the young men of the profession to get into practice, and their consequent impatience of due preparation. The trouble is much aggravated by the ease with which young architects succeed in getting a certain amount of work to do. A beginner of no matter how little preparation finds some friend to intrust him with the building of a house, and from that moment he considers himself fully embarked in the practice of his profession. The ease with which this point is reached tempts young men to begin with the smallest modicum of preparation. The first step seems a long advance, and is seductively easy to take. After it comes the slow toiling up hill, and the painful learning by practice, amid a good deal of poor work and probably a good many disappointments, of the things which might have been much more quickly and satisfactorily learned under training. Half a dozen years pass, and the practitioner finds himself no further ahead in established practice than if he had spent half the time at study, and with many opportunities lost for learning what he now will either never acquire or will only learn under the compulsion of some mortifying failure. It is surprising how quickly in most men the engrossment of practice supersedes the zeal of the student, — how hard it is, when we have once stepped into the field, to resolve to study out deliberately any matter which is not directly involved in some work in hand or projected. To most the change is complete and irrevocable, and the spirit of study for its own sake is gone forever.

The charge of inadequate preparation is much more serious and damaging now than it was a few years ago, when the means for such preparation were not at hand as they are now. There are means provided in the architectural schools of the country which cover all the necessary ground. The demands on the profession have correspondingly increased, and call not only for a more thorough but a wider training. It will not take a long continuance of such misfortunes to buildings as we have seen lately to educate the public to the importance of skill in construction, and to arouse a demand for it. When the demand makes itself felt it will be well with those architects who have prepared themselves to meet it. The architects of the country have the excellence and solidity of its building more at heart than anybody else. They can do much — more than any other influence except that of actual disaster — to encourage a proper standard of building. They have in the last few years led the public into great revolutions in the designing and planning of their buildings. It is their part to lead it in this matter also, and not wait to be driven by it.

ARCHITECTURAL PROGRESS IN BOSTON. — I.

IT is related of Audubon, that when engaged in his great work, he left with a friend a package of drawings which had cost him the labor of two years. The package was to be cared for while he further prosecuted his studies; but when at length he returned from a long tramp and called for it, it was found that rats had so injured the contents as to render them worthless. For a moment he surveyed the ruins in despair; but rallying said, "I can do it all over again, and better than before." With these words he

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shouldered his gun, turned once more to the woods, and there remained till his task was accomplished. How well it was done we all know, and that the last drawings were superior to the first we can well imagine, for the enthusiasm of the naturalist, aided by the experience he had gained, made it certain what the result would be.

I have been reminded of this anecdote while thinking of the Boston fire, and the energy and taste displayed in rebuilding the burnt portions of that city. It seems but a few months ago — so vivid is the impression left on the mind — that news was brought to us of the conflagration raging there; and when the magnitude of the fire was known, and that all human efforts to stay it were abortive, men's hearts quailed, and the stoutest stood aghast at the heaps of ruin when the flames were checked. But few, as they looked over that smoking waste, dared say that in a lifetime Boston would recover from so great a shock; even with help from abroad it seemed that she must be crippled for years, and that possibly the ground so suddenly lost would never be recovered. But in this how greatly have we been mistaken! With a stout heart, a firm reliance on self, and an indomitable will, she refused all aid, and as resolutely set about the work of rebuilding as did Audubon to make good his drawings. Nor was this all, for she not only labored to rebuild, but to improve on what had already been done, and so make a great calamity a public gain. How well the promise has been kept we all must see, and one who to-day treads her crooked streets, so recently a heap of ruins, will wonder, not that so much has been done in so short a time, but that it has been done so well. In architecture Boston has made greater strides in a given time than any other city I can call to mind. This can hardly be denied, but it has been met with the reply, "The great fire cleaned out much that was commonplace, and gave her the opportunity to build anew, — to exchange her brick for marble, her 'compo' for enduring stone." True, and she availed herself of her opportunity. Have other cities done likewise? It has been said of A. T. Stewart, that if he was a great shopkeeper (which we are all ready to allow) a combination of circumstances made the opening, and he, appearing at the auspicious moment, went with the current that led to fortune. But what if Stewart had not been equal to the emergency, had not been able to discern the set of the tide, the course of the current? should we ever have heard of him and his enormous wealth? Opportunities like that offered Boston have not been uncommon in America; how rarely have they been so well improved! New York in 1835 had a fire that burnt out the heart of one of the busiest portions of the city. It was a sight not to be forgotten; and well do I remember that I wondered, as I climbed over the heaps of ruin in Wall and Pearl Streets in search of trophies, when the loss would be made good. In time the "burnt district" was rebuilt; but who can tell, judging only from its architecture, where the new commenced, or what was done that was one whit in advance of any thing that had already been accomplished? What building is there of that date that New Yorkers are proud of, what one that raised or helped to raise the standard of our architecture? Certainly not the stores and warehouses, so like other stores and warehouses that line miles and miles of streets; nor do I believe they would care to instance the Exchange, much as was thought of it when its great shafts of granite taxed the resources of its builders to get them into place. That New York has made strides in its architecture I am ready to admit, but not in the same degree; nor can it accomplish all that may be done till there is less disposition to reproduce again and again, in part or as a whole, the façades of well-known buildings like that of the Pavilion Richelieu, — an ornate style that has captivated builders not only in the metropolis, but in other places. Boston, in common, yielded to the furor when this style came into notice; for when a city-hall was to be built, this same façade of the Pavilion Richelieu, shorn of the sculptured details that enriched the work of Visconti, was selected as the one best suited to the purpose. If the question were asked anew to-day possibly the answer might be different.

In all large cities the increase of trade, the growth of wealth, and the demand for new structures make frequent changes necessary, and buildings that in a less thickly populated community would do good service for generations are pulled down to give place to others better suited to the times and the ideas of builders. It is on this altar that so many of the old colonial houses of Boston have been offered up. Even King's Chapel, it was decided a few years ago, must yield to the pressing demand for more room; and but for the great fire, which for the time turned the current of thought in another direction, violent hands would ere this have been laid upon it. It is a landmark, and it is to be hoped that it will be left for many years, a memorial of the past.

The early architecture of Boston was of two types, and it is illustrated by two buildings, — King's Chapel and the Old South. The former is of the school that adhered to the Greek temple, adapting it to every possible use; the latter is known as the New England meeting-house style, which means the absence of architectural rules, proportions, and details, that in the eyes of the Puritans were associated with the house of Baal. The two schools were formerly pretty evenly divided; but the advocates of a more ornate style than that of the meeting-house ingrafted no new ideas on the old stock, nor did they do any thing to advance architecture. With them it mattered not to what use a building was to be put. Classic it must be, either Doric or Ionic; for they seldom resorted to the floriated Corinthian. They did not appear to have a thought or an idea that men could depart from this school; and so late as fifty years ago the sum and substance of an architect's training was to master the five orders and adapt them to modern wants. Boston was wedded to this "notion," and one of the leading architects of the past generation, Capt. Parris, has left evidence of his devotion to it in all parts of the city.

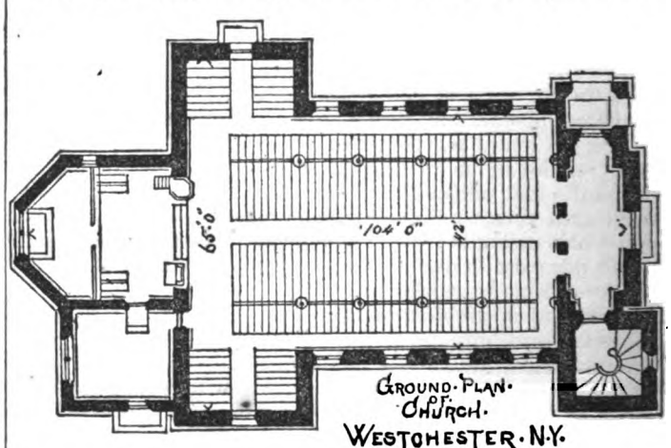
Prior to 1812 Parris was in successful practice in Boston, but was called away on the breaking out of the war, having entered the army as a volunteer. The war over, he returned to his profession of architect and engineer; and during his active career he built St. Paul's Church, the Massachusetts General Hospital, the Court House, Quincy Market, and many other structures, including many private residences. If we look at his public buildings we see the one idea, the adapting of the Greek temple to modern wants, and with the usual results. The pediment of St. Paul's is squeezed in between other buildings, greatly to its detriment, and the design itself is but a portico in front of an undecorated wall, with which it appears to have little or no connection. And in Quincy Market we have a Doric temple stretched out to an unconscionable length, a whole block, the two extremes being exactly alike. How many other buildings Parris would have designed (I cannot begin to give a list of those that came from his hand) if he had remained in the profession, it would be difficult to conjecture; but in 1830 he was appointed superintendent of the Charlestown Navy Yard, and remained in the employ of the Government up to the time of his death in 1852. He was greatly respected by all who knew him. Bryant, Hastings, and others were his pupils.

I mention these instances to show what a mania there has been in the past for Greek temples and Grecian details. We see it not only in some of the older churches and in the municipal buildings, but also in the hotels. The Revere has as much of it as could be well ingrafted on its front, and the entrance of the Tremont and the old United States are masked with Grecian columns. The Gothic has had no chance whatever, and when an effort was made to introduce it in Trinity Church, on Summer Street, it resulted in a failure, — the production of a great square machicolated tower, pierced with its one decorated window; the whole looking strangely out of place and painfully wanting as measured by the mediæval structures in the newer portions of the city. But every trace of it was swept away by the fire.

THE ILLUSTRATIONS.

RESTORATION OF ST. PETER'S CHURCH, WESTCHESTER, N.Y.
MR. C. L. W. EIDLITZ, ARCHITECT.
(128 Broadway, New York, N.Y.)

THE church was originally built by Mr. Leopold Eidlitz in 1851, and burned down last winter. Its interior and roof were entirely of wood, including furring, etc. All this is to be replaced with



stone construction, by building a clere-story supported by granite columns, having marble capitals and bases, and by lining the interior walls with brick.

HOTEL KEMPTON, BERKELEY STREET, BOSTON, MASS. MESSRS. CUMMINGS AND SEARS, ARCHITECTS.
(9 Pemberton Square, Boston, Mass.)

This was one of the earliest apartment hotels built in Boston. It was finished about seven years ago at a cost of about $80,000. Its plan is chiefly peculiar in having no kitchens or dining-rooms for the various suites, all the tenants using the common dining-room as in an ordinary hotel or boarding house. We believe this hotel has the first water-elevator that was built in the city for the use of passengers.

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CORRESPONDENCE.

ARCHITECTURE AT THE ROYAL ACADEMY. — I.

LONDON, 26 May, 1877.

THE art season is now in full swing. Besides the numerous smaller galleries, the Grosvenor — a new competitor for public favor — and the Royal Academy have been open for some weeks; and to judge by the crowds that daily throng the spacious rooms one would think we were a very art-loving people indeed. The architectural room at the Academy, however, is an exception to the general rule, in the way of crowding; in it we can breathe freely, and walk about at our ease, which shows our love of art is somewhat limited in its nature. Not that the collection of designs is below the average as the paintings at Burlington House are generally allowed to be this year, but that drawings of architecture fail to interest the public in the same sense that the works executed from them usually do, or else they are not understood by the majority of the visitors. From these and other causes, the architectural room is a haven of rest from the heat and the crowd of the more popular galleries, to the manifest advantage of those who wish to study the only public record of the year's work, in the collection of designs and drawings numbering some one hundred and sixty in all. In purpose the designs are pretty equally divided between ecclesiastic and domestic works, and in drawings between representations in color and in black and white by pen and ink; probably the former in both cases prevail to a greater extent than they did last year. There are no very important works; but on the other hand, there are few of a trivial nature, the bulk of the designs representing the ordinary routine work of the year. Two or three of the principal competitions are represented, though not always by the successful designs, such as the New Schools at Oxford and Cambridge; but others again, such as the new buildings at Leeds and Nottingham, are almost conspicuous by their absence.

In style our latest revival, the so-called Queen Anne, seems to hold its own, though it does not appear to have made the advance which could not fail to strike any one last year. Perhaps an exception to this remark may be made in favor of Mr. Jackson's Oxford Schools, to be noticed immediately as one of the most advanced and at the same time refined examples of the revival. The tendency seems rather to run after the features of the London Board Schools than to give us any thing fresh and original, to the manifest detriment of the style as such.

These is some good Gothic work, notably the churches of Messrs. Pearson, Bodley, and Shaw; but of classic architecture, properly so called, there is little or nothing calling for any special notice. Taking the drawings seriatim as they come in the catalogue, we find the list headed by an interior of the apse of Christ Church, Westminster (No. 1061), by Mr. A. Bickerdike, a very good "bit" of a well-known church, too well known for any further remark than that it is a very fair specimen of good modern Gothic. In Nos. 1062 and 1066 we have two of Mr. James Brooks's churches, the former at Donne in Scotland, and the latter at Lavender Hill, London. They are both in the strong severe semi-French phase of Gothic which Mr. Brooks affects. The church in Scotland is as unlike Scotch Gothic as it well could be; no effort has evidently been made to introduce any local or national features, which is to be regretted considering how much there is beautiful in the Gothic of the North. While the church at Lavender Hill is similar in its features to several others by the same author, but neither better nor worse, No. 1063, St. Paul's Church, Manchester, by Mr. J. O. Scott, is a very stringing and weak example of Gothic. No. 1064, Woodcote Hall, Salop, by Mr. F. P. Cockerell, shown by rather a weak drawing, is a very poor type of an English house in a free treatment of classic; it has a certain picturesqueness combined with its classical air, which goes to make up a very pleasing exterior, well balanced in its parts, and careful in its detail.

Noticing No. 1069, 64 New Bond Street, by Mr. Edis, as being with its weather-tiling and high pitched roof more like a country house and shop than a London one, clever though it is in design and treatment, we come to No. 1012, the Church of St. Margaret, Ilkley, by Mr. Norman Shaw. This is a large cruciform church in late Gothic; it is built on a most uneven site among hills, and consists of a nave with side aisles, transepts, and chancel, with a crypt or rooms under the latter. The view is taken from the north-east. No tower or spire breaks the long line of rather flat pitched roofs; only a simple but quaintly designed belfry marks the division between the chancel and nave. The windows of fifteenth century type are placed high in the walls; and the whole treatment is at once picturesque and admirably adapted to its surroundings. The drawing is in Mr. Shaw's best manner, and shows the character of the detail to great advantage. The church looks like old work, notwithstanding the originality of the design, so well has the true spirit of the style been caught and applied. The result also shows the tendency in favor of late Gothic, which has more than once been remarked in the works of the best men. Mr. Shaw's other contributions are not perhaps of equal power. They are No. 1086, two views of Merrist Wood, Surrey, almost a revival of a sixteenth century manor-house, though not by any means so interesting as some others of Mr. Shaw's houses; and No. 1103, Swan House, Chelsea, a riverside mansion in the Queen Anne style. It has nothing particularly worthy of remark except the peculiar manner in which the upper stories overhang the bay-windows of the lower. The bay-windows themselves are nicely designed, but the result of the treatment is not very happy.

In three richly colored drawings (Nos. 1078, 1089, and 1097) we have three views in the interior of the Church of the Holy Angels at Hoar Cross, near Burton-on-Trent, by Mr. G. F. Bodley. This is a church erected by a lady as a memorial to her husband. A view in the nave, and a couple of views in the chancel, show us how splendidly her intentions have been carried out. It is a cruciform church, with a square tower at the crossing; in style, late Gothic of the fourteenth-century type, most admirably designed and detailed. The tomb, with arched canopy over, is worthy of old work, so good is the detail, so excellent is the general design. We have here the work of a true artist, thoroughly English in its character, and worthy to take its place with the best of our old examples. This, like Mr. Shaw's, is *real* Gothic, — no French or Italian affectation, but deeply imbued with the spirit of the old work; thoroughly national and thoroughly true. From good work like this it seems but a step to the very fine old church shown in No. 1081, which is Sir G. G. Scott's proposed re-arrangement of the choir at Tewksbury Abbey. It is impossible to tell its value as a "restoration," unless a drawing had also been given of the church as it now exists; but it seems a simple and an appropriate arrangement, and is shown in a very fine drawing in pen and ink.

Passing a good drawing by Mr. Waterhouse, of the clock-tower of the Manchester Town Hall, we come to one of Mr. Street's clever pen-and-ink drawings, a view of the chapel and library at Dunecht, Aberdeen, — very clever also in design, but failing, we think, to catch the spirit of the Scotch work among which it is built. It is not Scotch Gothic, whatever it is, which is surprising in one with whom we thought local tradition would have had some considerable influence; nor, by the way, does it strike one as being very domestic, good Gothic though it is. Mr. Street's other contribution is St. Mary's Church, Southampton. This church is to be erected as a memorial of the late Bishop Wilberforce of Winchester. The view shown here is from the south-east, and is characteristic of Mr. Street's work in most of its leading features. Though it may have a family likeness to some others which have gone before, still it is a likeness to a very good family, and is in itself a very good church, full of good work, and handled in the masterly manner we expect from such an artist as Mr. G. E. Street, R.A.

In Nos. 1090 and 1098 we come to the designs by Mr. G. G. Scott, jun., submitted in the recent competition for the new Divinity Schools at Cambridge; the former in late Gothic, the latter in Queen Anne. With these it is interesting to compare Nos. 1137 and 1138, designs for the same work by Mr. Basil Champneys, the former Queen Anne the latter and successful design in late fifteenth-century Gothic. It is curious that both competitors should have sent in alternative designs, and in the same styles, each showing in a marked degree the individuality of their authors. Both the late Gothic designs are good and appropriate in every way to the university. Mr. Scott's Queen Anne design is also a quiet, artistic piece of work, almost more suitable to the purpose than those in Gothic; but Mr. Champney's in the same style is like a good deal of his Queen Anne, eccentric if picturesque, as if he strained after the oddities of the style rather than its beauties. We think it was a wise decision, even for his own sake, that the Committee chose his Gothic version rather than his Queen Anne; it is in much better taste all through, though even in it he can hardly help being quaint at the expense of artistic merit, and consequently we find some very questionable details introduced here and there. All objections apart, however, these designs are the work of true artists. From Cambridge to Oxford seems a natural procedure, so we next notice the designs for the New Examination Schools at the latter university; they hang side by side in Nos. 1153 and 1154, — the former, the successful design in Queen Anne, by Mr. T. G. Jackson, and the latter in late Gothic by Mr. Champneys. It is the view in the quadrangle Mr. Jackson sends, and though the drawing might be better it shows a thoroughly artistic design with many good points about it, notably the picturesque doorways in the angles of the "quad;" but of the most striking feature in the design, the front hall, we get no view, much to our regret, as the representation of the work is incomplete without it. This is one of the best works yet produced by the so-called revival: refined and dignified to a degree, it is yet quaint enough to attract the lover of the picturesque, and is withal the work of a true artist. Mr. Champneys' design for the same building (in late Gothic) is much better, to our thinking, than his Cambridge building. It is shown in a remarkably able pen-and-ink drawing, and is a vigorous and at the same time artistic piece of work. The general grouping and details are capital, much more so than his Divinity Schools just noticed, and if the Oxford competition came second his practice in the Cambridge one has stood him in good stead. Unsuccessful though it has been, it looks what it is, an important building in such a university as Oxford, and worthy of its place.

With these drawings must close our notes for the present, with the remark that as most of these designs have been or will be

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published in the London architectural journals, and so will be seen by most of your readers, it has not been thought necessary to describe their features more fully before offering any criticism on particular points, as, with the help of such illustrations, a very fair acquaintance can be made with nearly all of them.

THE CHENEY BLOCK. — LONGMEADOW STONE. — THE HIGH SCHOOL. — THE RETREAT FOR INSANE. — THE THEOLOGICAL SEMINARY.

HARTFORD, CONN., June 11, 1877.

As a large insurance centre Hartford is well known; and to one of her companies is due perhaps the comparatively recent impetus to building — architectural building — which the city has received in the case of large secular structures. This was some ten years or more ago, when the late firm of Bryant and Rogers erected the huge pile of granite known as the Charter Oak Life Insurance Building, — a monument to the enterprise and wealth of the company, and one almost *ære perennius* to the professional skill of the architects. Before this building was completed, still another was in process of erection from their designs; and other companies, not to be outdone, expended goodly sums upon buildings of their own, until it seemed as though there was to be nothing of note in the form of public structures — churches excepted — save these Renaissance insurance palaces. But recently other corporations have come to the architectural front.

To-day Hartford is perhaps richer with architectural promise, than with the present fulfilment of professional work; but in consideration of the general severity of the times, which has clogged the wheels of progress, not a little building has taken place during the past season and is in prospect for the present one.

The completion of the new Cheney Block on one of the principal streets of the city will add another fine structure to the list of public buildings; and although its vast proportions were at first (in the eyes of the average beholder) something of an elephant, they were but a nine-days' wonder. The block is the property of the Messrs. Cheney, whose extensive manufactures of silk have placed them in the van of American manufacturers, and whose industry has built up a small community a few miles east of this city. The designs and plans of the block are by Messrs. Gambrill and Richardson of New York, or we might say of Trinity Church, Boston, as their names seem to be inseparably connected with that remarkable structure. The treatment of arched work and the construction of windows and many other features emphasize the particular style adopted by the architects in a large number of their more recent works. The materials used are the Longmeadow stone for the ashlar, laid up with rock face and Ohio stone, the latter furnishing the door and window caps, sills, etc. The string-courses in this stone are carved with much spirit, and add greatly to the expression of the façades.

The Longmeadow stone is deserving of extended mention on account of its color, although its formation is somewhat irregular, the stone being known as liver-rock. It is not as much of a favorite in this section of the country as it is in Massachusetts, the stone having a formidable rival in the Portland quarries, located a few miles below Hartford on the Connecticut River. While both these stones come under the head of dark ones, the Longmeadow has about it a slight suggestion of red which relieves it of the sombre cast of the Portland, and its use in ornamental work in connection with the Ohio is particularly good. An example of the combination in question is happily brought to mind in the recent building for Smith College at Northampton, Mass., where are miniature columns whose caps and bases are cut from light stone, the shaft being composed of the reddish sandstone from the Longmeadow quarries.

The Cheney Block has a frontage of 155 feet with a return on a side-street of 116 feet; it is five stories high, and is treated with a square corner tower having a pyramidal roof covered with tile; the front façade is relieved by curtain walls, and the lofty arched openings with which they are pierced extend through several stories enclosing the windows on each floor. The ground floor provides ample stores, while the floors above are divided into suites of rooms to be used either as offices or lodging apartments. The entrances to the block are far from spacious, and the hall-ways are narrow, the upper floors resembling an intricate network, while the corridor which occupies nearly the entire length of the block is open to criticism. A Masonic hall is on one of the upper stories. The building when completed will cost about $500,000.

In the matter of public schools, Hartford shares to a certain extent the pride of Boston. The demand for increased accommodations at the high school is a guaranty of the excellent management and success of the institution. The present building was erected in 1869, and last spring plans for important additions to it were made by Mr. Keller, an architect of this city, which are now in process of execution; they provide for a wing about 30 feet wide by 80 feet in length, the new schoolrooms furnishing seating capacity for 112 scholars. The work is under contracts for $22,000.

The Retreat for Insane which several years ago was remodelled by Messrs. Vaux, Withers and Co., of New York, is to have some important additions to its many buildings. They are to be built from Mr. Keller's plans and will embrace a series of structures 140 feet in length by 80 feet in width, which will enclose a court-yard to be used as a clothes-drying yard for the laundry. The buildings are to be used as the laundry, storage rooms, etc. The material used is to be a light granite to conform with that of the chapel lately erected. Important and much-needed alterations in the landscape architecture of the grounds upon the western frontage are also to be executed.

Among the new building-projects is the erection of buildings for the Theological Seminary, a Congregational institution which of late years has had its seat at Hartford. A superior site has already been purchased, the lot having a frontage of some two hundred feet upon an important street which is destined to become one of the principal thoroughfares of the city. Buildings two or more in number will provide accommodations for about fifty students. Pecuniarily, the institution is well circumstanced, and besides the possession of a good fund the annual income is in excess of current expenses. The date of building has not as yet been determined.

CHETWOOD.

SIR MATTHEW DIGBY WYATT.

IT is indeed a light of no ordinary magnitude in the artistic world that has been sadly extinguished in the death of Sir Digby Wyatt. A man universally popular, and more so perhaps for his intellectual accomplishments than for even his personal graces; one whose facile pencil was never at a loss, and whose sound scholarship was always at command; we have now to speak of him at last as an over-tasked student who, like too many others in these days, has succumbed to the intensity of his application, and whose energies, great as they were, have given way in the very prime of life before the vastness of his subject and the devotedness of his mind. It is well known that for several years past he has had to live entirely removed from the world of business; and it cannot be disguised that, but for that over-study in earlier life which is so fatal, however slow, in its effects, we ought in the ordinary course of nature to have possessed him in all his vigor for many years to come.

We must go back for more than thirty years to find Matthew Digby Wyatt first attracting attention as a student in Rome; and we may say that what brought him into notice then amongst his fellows and friends was the same character for accurate study and unwearied perseverance which he carried with him through life. His drawings of those classical and Renaissance subjects of which the Eternal City is full to overflowing were at once perceived to be those of a master in the practice of art; at the same time his thorough knowledge of all that was to be known by research and reading was beginning to be remarked upon as indicative of the eventful possession of such a store of information as few if any of his class had ever had to call upon.

When the organization of the details of the Great Exhibition of 1851 had to be undertaken, a young artist of this rare character was precisely the man to be employed in the task. Suffice it to say, that he was acknowledged to have done his part with the utmost ability and tact, and that the foundations of his fortune were laid.

It was not many years afterwards that his name became still more a household word with the public in connection with the construction of the Crystal Palace at Sydenham. Perhaps the feature in that astonishing edifice which most emphatically fixed the attention of all classes of the community was the Architectural Courts; and it became known that it was to Owen Jones and Digby Wyatt that we were indebted for these intellectual luxuries, and chiefly to the latter of these thenceforward inseparable friends in art. In other parts of the work also it was understood that both had contributed their invaluable aid; but Owen Jones was at least famous before, and Digby Wyatt became equally famous now. It is easy to argue that these Architectural Courts were never meant to be much more than a show for the vulgar. What has to be more particularly remembered is how easily, how very easily, they might have been a failure and indeed a laughing-stock; whereas on the contrary it would be vain to deny that they not only were pronounced an unexpected success at the time, but have retained their hold of public favor to this day — and not at all amongst the vulgar alone, but with the most intelligent of those who from all quarters of the country and of the world have visited the Crystal Palace for more than twenty years as an act of pleasant pilgrimage.

The close connection with Owen Jones which, thus begun, lasted through their joint lives, was eminently characteristic of the peculiar bent of Wyatt's mind. With all his unparalleled accumulation of architectural knowledge, as essentially the knowledge of the profession to which he had devoted himself, it was to the design of the ornamentalist that he seemed to turn, after all, with the greater cordiality. In the case of his friend it was considered that the impulse towards the same destiny had been more accidental; for it was the study of the Alhambra as a mere novelty of architecture which was supposed to have landed Owen Jones in ornamentation as a profession almost against his wish. With Jones, moreover, the ornamental fancy ran through life very much in a single channel; he had become identified with the Alhambra at the beginning, and, speaking in general terms, his instinctive style was that of the Alhambra to the end. Not so, however, with Wyatt, who, by com-

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parison, may be almost said to have had no preference at all; his mind was charged, not with one mode, but with all modes equally.

Nor was even this all; for such was the capacity of his artistic intellect that not only all modes of one art, but all modes of all arts, seemed to be alike to his pencil. He was *par excellence* the "many-sided man" of his order; so much so that, although he made no secret of his preferences of taste, there was nothing he could not do, and do well, so far as a sheet of paper might take it. In other words, in all that draughtsmanship could accomplish, in whatever department of its wide application, he was the most scholarly of draughtsmen and the most versatile of designers.

In architecture properly so called, although it might have been supposed that the long practice of ornamentation had weakened his memory, and the continual changes of fashion distracted his fancy, it is said by one of his intimates that he was the only man in the profession who was prepared at any moment to throw off a sketch of design for any subject that might be directed, and in any recognized style that might be called for, and to do so, not at hap-hazard or in a way to require apology, but with the perfect ease and certitude of a master of the particular style. We may admit the possibility of exaggeration here, and yet perceive at the basis of such a bold assertion the presence of a very remarkable versatility of power of the highest order.

It was no disparagement of the accomplishments of so learned a designer when it was said, as no doubt it often was, that the possession of such facilities of memory must necessarily involve deficiencies of imagination. In other things besides artistic design it is well known that the scientific faculty and the imagination, if ever found to exist together in the same mind, are displayed, not only abnormally, but imperfectly. In this view of the case, the vast knowledge which Digby Wyatt had acquired would be regarded as a scientific knowledge, although of the imaginative arts. He had collected an infinite number of their examples, had classified them, had analyzed them perhaps, and extracted their principles, and so had stowed them away in the chambers of his memory to answer whatever call he might have to make upon them. A mind so stored with precedents for reproduction — thus runs the argument we refer to — is not found to possess that very different form of force which, instead of reproduction, effects creation. One designer in architecture, for example, works from the book; another works from the brain. The cyclopædist, therefore, whose book knowledge is infinite, must necessarily fail when he seeks to call up something which book knowledge does not comprehend; his work may be infallibly correct, but it cannot be novel. Without pursuing the argument further, it may perhaps be safely admitted that the mind of Sir Digby Wyatt was, in this sense, less imaginative than many; but at the same time it may fairly be replied that whether, in these days when authenticity goes for so much and originality for so little, the faculty of invention is inevitably preferable to that of correct reproduction, is a question by no means to be easily determined.

Still pursuing the same train of thought — for we are inclined to regard this astonishing versatility of knowledge as the chief point in his character — we may turn to the lectures delivered at Cambridge in the capacity of Slade Professor, and especially to the remarkable series belonging to the year 1870 and published immediately after their delivery. Nothing probably could be more entirely different from the treatment of art by such professors as Mr. Ruskin, Mr. Poynter, and Mr. Colvin, than the process adopted by Sir Digby Wyatt. "I stand before my audience," we might imagine him saying, "not as a critic, but as a working artist; not as a painter, a sculptor, an architect, but as a universal practitioner in all art whatsoever; and especially as an academical ornamentalist, one who has collected every thing that can be delineated, delineated every thing that can be collected, and read every thing that about such things has ever been written." His process was simplicity itself. First there was *Architecture*, in its history, its theory, its practice. Secondly there was *Sculpture*, in its history, its theory, its practice. Thirdly there was *Painting*, in its history ancient, its history modern, its theory, its practice. Lastly there was *Industrial Art*, ancient and modern; and so the end. Now nothing could be easier, of course, under this programme, than for such a person as one of the clever amateurs of our day, or even some smart professional lecturer in a polytechnic institution, to read up a dozen articles in the "Encyclopædia Britannica," and thus to string together a sufficient array of commonplace paragraphs to give to an uninitiated audience a vague idea of the existence of the arts and of the forms of their existence. But it is needless to remark that this is not what Sir Digby Wyatt laid before the students of Cambridge, and afterwards published to the world. One has only to look, for instance, however hastily, through the lectures on Painting, to see how thoughtfully the author had carried personal research through the whole subject, from the mere surface of criticism which he was almost ashamed to dwell upon to the very depths of philosophy into which he could not possibly profess to carry his hearers with him. So also is it with sculpture, the least understood if not the most recondite of all the arts; and so also with architecture, we need not say, in which he was unquestionably at home; and none the less with the industrial arts, with which he was equally familiar by profession. He was truly here also, as a many-sided man and a master of all the arts, such a one as we may not hope to look upon again.

In personal taste, Wyatt was certainly a classicist. Whatever may have been his knowledge of Gothic art, and however sincerely he may have regarded it with eclectic admiration, there was never in him that peculiar love of the picturesque in preference to the serene which leads an architect in these days to the mediæval ecclesiastical remains by an irresistible fascination. The European Renaissance, especially in its first Italian forms, no doubt was his especial delight; and we need not hesitate to add that in this was his success, whether as a draughtsman or as a designer, the most complete.

It is perhaps well — we say it with reverence and sorrow — that a man so gifted and so industrious should have passed away before old age had reduced him to the common level of humanity. He died, not of years, but of work. If he had put off his harness, it was because he was weary, not because he was old. The name of Sir Matthew Digby Wyatt will long be remembered with honor, as that of one who has done his task with honest hard work, and done it quickly and well. — *The Architect.*

NOTES AND CLIPPINGS.

THE MARYLAND STATE HOUSE. — The State House at Annapolis, erected more than a hundred years ago, is being restored by Mr. George A. Fredericks, a Baltimore architect. Complaint had been made of the state of decay into which the building was falling, the bad ventilation, poor heating-arrangements, etc.; so that the last Legislature made an appropriation of thirty thousand dollars for its repair. The walls were found in some places to be dangerously impaired in strength; and they are being made secure by underpinning and strong girders where required. The floors of the entire building have been renewed, and a new slate roof will be put on. The building has been newly roofed three times, as was discovered on examination; and each time the old roof of shingles or tin has been allowed to remain, and was merely covered over by the new one. New heating-apparatus will also be put in. But with all the improvements, care will be taken not to alter the appearance of the Senate Chambers, the scene of Washington's surrender of his commission after the glorious end of the Revolutionary War. All features in the building that are calculated to excite the veneration of visitors will be preserved as far as practicable.

ANOTHER SCAMPED PUBLIC BUILDING. — The following report upon the condition of the North Indiana Penitentiary at Michigan City, Ind., was recently presented to the directors: "We, the undersigned architects and builders, have made a full and thorough examination of the outside wall of foundation of the north wing of the cell-house of the Northern Indiana Prison, recently constructed, and find the same to be laid in mortar of a very inferior quality, and of small stone not of proper size, and very poorly bonded, and not in accordance with the specifications on file; and we deem it necessary for the safety of the building about to be erected, to excavate said outside wall foundation, and replace the same with proper material; and believe the interest of the State will be benefited thereby. — Thomas Miles, superintendent of works; D. Kennedy, city and government engineer; O. Schnieder, architect; Thomas Culburt, builder; Philip Ersling, builder; E. J. Green, builder." The rebuilding of this piece of work will delay the work of building the cell-houses some three weeks, and cause a loss to the State of about $5,000. Mr. William Myers of Fort Wayne was the builder, and received $7,000 for the same. The commissioners that accepted the work were unacquainted with this kind of work, and were therefore unable to detect that the builder was swindling the State; thus furnishing one more example of the inadvisability of intrusting important works to the supervision of a general building-committee.

THE THOMAS GARDEN PROJECT. — The subscription books of the Thomas Concert Garden Company are filling up beyond the expectations of the projectors. Already over thirty retailers have made arrangements to secure shops in the arcade on the street floor. The subscription of Mr. William H. Vanderbilt, which was promised by him before his departure to Europe, but which had not been placed formally upon the books, has been the subject of cable correspondence, and Mr. Vanderbilt has telegraphed that upon his return he will immediately make good his promised subscription.

A TRADES-UNION SUIT. — Judge Barrett of New York has recently given a decision which is quite important to trades-unions. Two men were expelled from the membership of a society organized under the general law of New York for the incorporation of charitable and like associations, to which they had paid assessments, because they violated a by-law which provides that its members shall not work for less than forty cents an hour. These men worked for thirty cents; and thereafter the society refused to receive their regular dues. They accordingly brought proceedings for a peremptory mandamus to compel their reinstatement. After hearing the case, the judge decided that such a by-law is "unreasonable and oppressive, and contrary to public policy. It limits," he declares, "the man's right to earn a livelihood in his own proper way, for conduct which is not inherently wrong, nor subversive of any benevolent or charitable purpose, and is therefore void." Judge Barrett issued a peremptory mandamus requiring the reinstatement of both men.

NORTH AND SOUTH AMERICAN RAILROAD. — We learn from *La Semaine des Constructeurs* that a scheme for a railroad connecting Buenos Ayres with San Francisco is now preparing in the latter city. The line would be about 6,000 miles in length.

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THE WASHINGTON MONUMENT. — It is the determination of the friends of the Washington Monument project to complete the monument on its present foundation. The president has accordingly requested the engineers and officers composing the commission to investigate the stability of the foundation to meet in New York at an early day to consider and report upon the practicability and cost of giving additional spread to the foundation, so that the subject may be presented to Congress at the extra session in October next.

THE LAST OF THE CENTENNIAL BUILDINGS. — There was something very suggestive of the growth of mushrooms in the way the small buildings grew into being upon the Centennial grounds a year ago, — a growth whose rapidity has been outdone by the rapidity of their destruction. The Park Commissioners having found that certain buildings had not been removed from the grounds attempted to serve notices upon their various owners; but they had been sold and resold so many times that it was impossible to trace out the present owners, so notices were posted upon the buildings calling for their removal within five days. At the end of this time Gen. Thayer with a hundred and fifty laborers appeared upon the ground, and under the protection of a squad of the Park Guard proceeded to pull down the obstructing buildings. Their summary method of procedure was shown in their treatment of the Municipal Building, which was brought down by three pulls. Among the buildings so treated were the Michigan building, the Arkansas building, the Spanish barracks, several booths, stands, etc. Unfortunately among the buildings so destroyed was a building belonging to the United States Government and used for the exhibition of powder-testing machines, electrical apparatus, etc. One of its peculiarities was that, in case of the explosion of any material within, it would fall to pieces; in fact, the building was once demolished by an explosion of two hundred pounds of powder, and was reconstructed at Philadelphia, to show that the effect of an explosion within would merely cause it to come apart without the destruction of the material. Its second dissolution seems, however, to have been accomplished with less expenditure of force. This interference with its property the Government has resented; and the matter has been placed in the hands of the Attorney-General with instructions to proceed against the Finance Board of the Exhibition to recover damages.

FALL OF A CHURCH BELL. — As the sexton of the Congregational church at Newburg, Vt., was ringing the bell (which weighs about one thousand pounds) for evening services, June 3, Sunday, the iron standard upon which it is supported spread, and the bell fell with a crash about two feet, and would have crushed down through the bell-room and entry to the cellar, had it not been for the bulkhead door, which was partly open, and rested on some strong timbers. It was a narrow escape for the sexton. It is rather curious that an accident similar in its nature to the one which our New York correspondent mentioned lately as having nearly occurred at Binghamton, N.Y., should have happened so nearly at the same time.

THE WAR DEPARTMENT BUILDING. — Secretary McCrary has annulled the contract for the completion of the War Department building, and made a new one which will save thirty-three per centum.

THE PILGRIM MONUMENT. — The Hallowell (Me.) Granite Company has nearly completed the Goddess of Liberty which is to surmount the Pilgrims' Monument at Plymouth. The figure is forty-five feet high, and the stone from which one arm alone was cut weighed sixty tons. The company have also a colossal statue of David and Jonathan, which is nearly finished.

THE LAST OF TABLE ROCK. — On the 24th ultimo the last of what was so long known as Table Rock, at Niagara, broke off and fell into the river. The mass weighed nearly sixty tons, and up to 1876 over four thousand names of visitors had been carved upon it. The part which fell on the 24th composed only half of the original rock, the rest having fallen in. On Saturday, Jan. 1, 1829, a surface of the rock supposed to be the size of half an acre, forming the bed of Maiden Walk, broke loose, and was precipitated into the immense chasm below. The crash was heard for a distance of five miles, and the effects in the immediate neighborhood resembled the shock of an earthquake. The water running under the bank is supposed to have caused the fall on the 24th, and the shock when the rock struck the water was distinctly felt three miles from the fall. Several of the trees which stood on the rock are now seen standing in the river as erect as when in their original places on the rock. Where the rock shelved off from the bank, at a distance of twenty feet from the top, can be seen the root of a tree estimated to be two feet in diameter. It attracts considerable attention. — *Syracuse Standard.*

ALMOST AN ACCIDENT. — It is not an uncommon thing to test a bridge or floor by marching soldiers over it; and the anecdote that is told of the way that the theatre of the Palais Royal at Paris was tested in 1781 is known to our readers. It seems quite as heartless to test a society hall under the guise of friendship and fellowship, as was seemingly done at Shelburne Falls, Mass., on the 8th inst., where, during the dedication services of a new Odd Fellows' Hall, whereat a large number of visiting brothers were present, one of the girders of the building broke, causing the floor to settle. The audience was quietly dismissed, and no serious mishap occurred.

STATUES FOUND ON THE ISLAND OF MELOS. — Four marble statues have lately been found on the island of Melos, on the property of Mr. Nostarki. Among them is a statue of Poseidon in good condition. Other finds are reported.

THE SALON OF 1877. — Of the 4,616 works of art to be exhibited in this year's *salon* at Paris, only 83 are architectural designs.

CONCRETE BRIDGE. — At Seaton, England, a three-arch bridge is being built of concrete, on a new principle invented by Mr. Brannon, of London. The idea of the inventor is that concrete will for such work prove far more enduring than stone. The toll-house at the end of the bridge is being built on arches. Mr. Brannon suggests that by constructing cottages on arches, instead of on the solid ground, all fear of fever caused by exhalations from the soil would be avoided; and it is understood that Sir Walter Trevalyan, on whose estate the bridge is being built, is about to have a number of workmen's cottages built on that principle at Seaton.

CLEOPATRA'S NEEDLE. — The exhumation of Cleopatra's Needle has been completed. Eighteen inches of the apex are gone, and the corners are somewhat damaged; but otherwise it is in a fair condition.

THE VENDÔME COLUMN. — It is stated that M. Courbet has at length decided to pay for the re-erection of the Vendôme Column, asking only to have sufficient time granted him for the purpose. He is to be allowed to refund the expense of re-erecting the column, which was 323,091 francs, in yearly instalments of 10,000 francs.

STATUÈ OF BLANCHE OF BRITTANY. — A very curious specimen of statuary has just been placed in the Hotel Cluny at Paris. This is a statue of Blanche of Brittany, the wife of John I., Duke of Brittany, taken from her tomb in the Abbey de la Joie, near Hennebont. At the time it was made the art of casting in bronze was only known to bell-founders: hence this statue was wrought from copper with the hammer, and the pieces were soldered together upon a core of wood.

THE PNEUMATIC CLOCKS OF VIENNA. — A practical clockmaker, Mr. J. Fattorini, gives the following account of the system of regulating clocks which has been introduced into Vienna by an Austrian engineer, Herr C. A. Mayrhofer, who has hit upon the expedient of pneumatic tubes as a means of securing uniformity in the time of clocks in any part of the city: Tubes are laid in the street from the central station, in which is the "master clock," or rather two clocks working together; and should one get wrong, the other keeps in motion, and an alarm bell is rung to indicate to the attendant that something is wrong, and he at once rectifies it. The air is pumped from the station, and just as gas or water can be taken into houses by means of pipes, so can the pneumatic tubes be laid, and people can receive their time just as they get their water or gas, the tubes being always kept fully charged with air. Branches can be taken in any direction. A simple contrivance connected with the tubes and the clocks lets off a puff of air every minute or half-minute, and the fingers of the clocks are in that manner pushed forward with unerring accuracy, in accordance with the time indicated by the standard timepieces of the Observatory, so that exact uniformity can be maintained without difficulty in the time shown on any number of dials. Housekeepers and others can be relieved of the trouble of winding up their clocks, as nothing of this kind is required in the pneumatic system, which is worked in much the same way as the supply of gas or water, with this difference, however, that the clocks are self-acting in letting off the time. Endeavors have been made to use electricity in this way, but the changes of temperature and other difficulties have formed an insuperable bar to the adoption of electricity as a motive-power for any number of clocks. The weather has no effect on the air, so far as the working of the pneumatic clocks is concerned; and be it hot or be it cold, the little valve lets off its puff of air, and the clocks go accurately, in defiance of atmospherical influences. A small yearly charge is made for the clocks, and there is no further expense or trouble. The system has been in operation in Vienna for nearly four months, and has worked without a single hitch, so that people are beginning to realize the idea that time can be "laid on" in their houses as readily as either water or gas. Mr. Fattorini says that after a minute inspection, and inquiries made in every direction, he is of opinion that the inventor has solved a great difficulty, and that the adoption of this excellent system of timekeeping throughout the world is merely a question of time; as the merits of the invention become better known, its simplicity, cheapness, and accuracy being its principal recommendations, it would prove, he thinks, especially useful for public clocks.

THE PODESTÀ AT FLORENCE. — A correspondent of the *Academy* writes from Florence: "For some centuries now, the authorities here have been engaged in destroying the great works of their great artists. The clergy especially have done infinite mischief, and generations of bad artists and bad architects have been employed to degrade and in many cases irremediably injure some of the grandest and most beautiful works of their predecessors. . . . As yet the only successful restoration made in Florence is that of the palace of the Podestà." The Podestà, or Bargello as it is often called, was erected, as it now stands, in the fourteenth century by Agnolo Gaddi.

MOTIF. — The French word *motif*, used in an architectural sense, is newer even than the verb *motiver*, which was admitted into the Dictionary of the French Academy only since 1740. The substantive has three significations: (1) *Motif*, equivalent to our word "motive." (2) *Motif*, a term in music; for instance, *Motif principal, la phrase de chant qui domine dans tout le morceau.* (3) *Motif*, a term of architecture, "*se dit*," to repeat M. Littré's words, "*de certains sujets de sculpture — 'Près du cercle international se trouve le parc anglais dont le motif principal est une pagode de l'Inde.'*" The word should never be used in the sense of "detail."

WHITE CEMENT. — Herr O. Fahnejehn recommends as a white cement a mixture of 75 parts carefully washed chalk and 25 parts of washed kaolin, to be first calcined to a red heat, and then ground. The resulting powder is snow-white in color, or if the heat has been too great, of a bluish tinge. Either alone or mixed with a small percentage of gypsum, it makes an excellent hydraulic cement.

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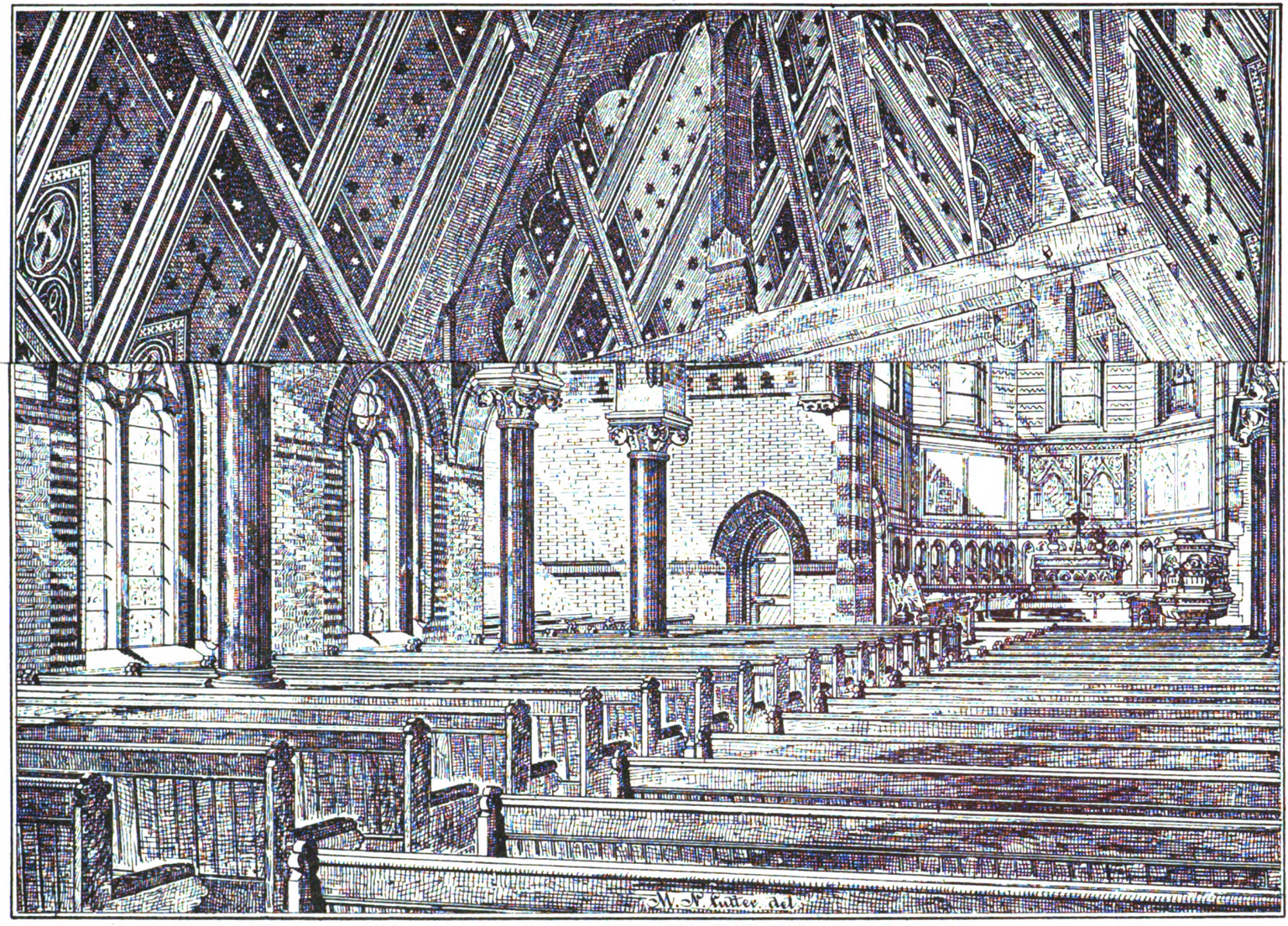
RESTORATION OF ST. PETERS CHURCH. WESTCHESTER N.Y.

CYRUS. L. W. EIDLITZ. ARCHT.
128 BROADWAY, NEW YORK.



HELIOTYPE

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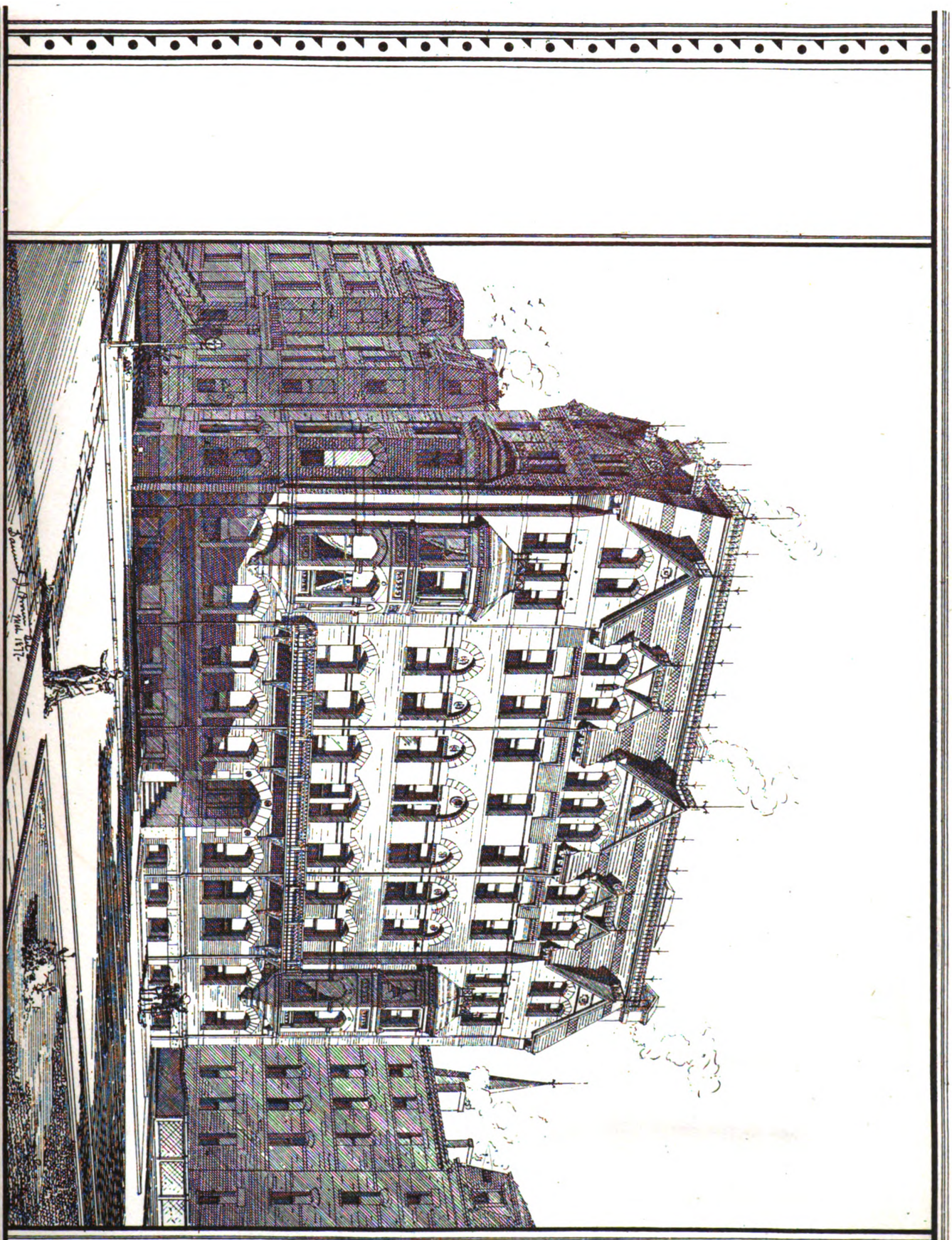

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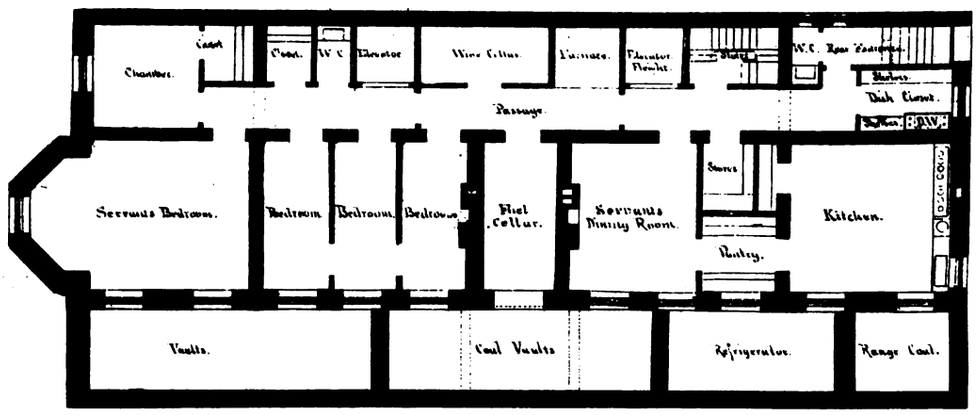
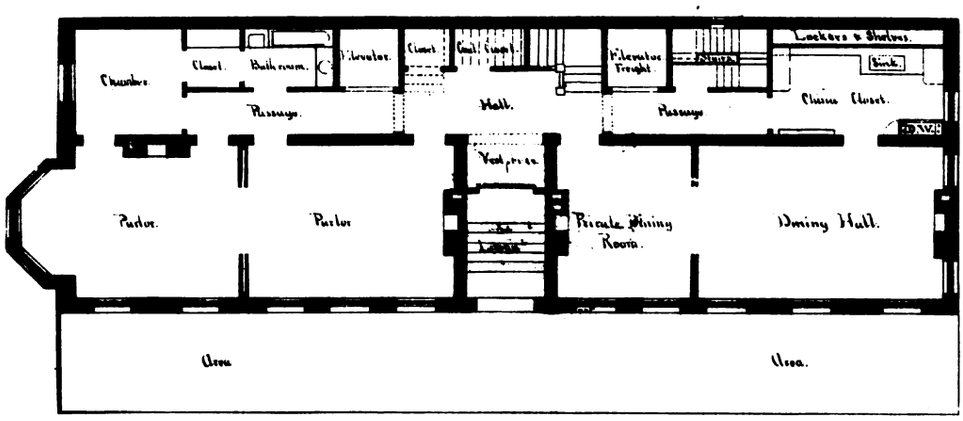
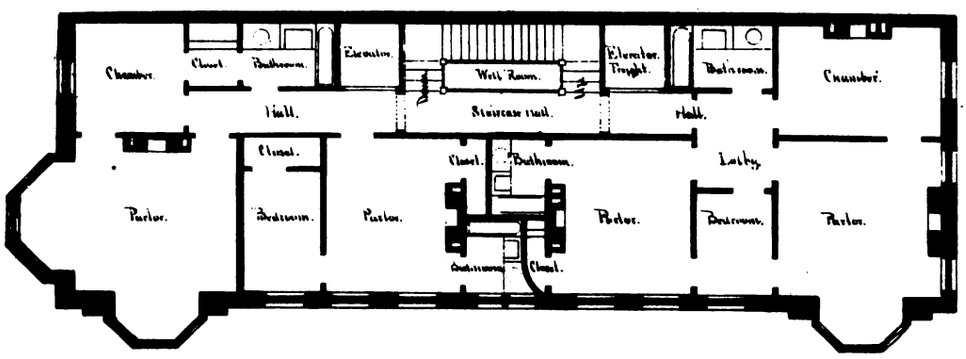


—BASEMENT PLAN.—



—FIRST FLOOR PLAN.—



—SECOND FLOOR PLAN.—

—Hotel Kempton.—

—Cummings & Sears: Archts. — Boston, Mass.—

Scale of feet.

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BOSTON, JUNE 23, 1877.

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THE battle over the Rockford Court House seems likely to end to the profit of the contractor, Mr. Richardson. By the order of the Board of Supervisors Mr. Gay's plans were committed to Gen. Smith, the engineer on the committee of experts whose report we published in our paper of June 2, and two others, who were instructed to state what modifications ought to be made in the plans to insure the safe rebuilding of the court-house. Their report, which suggested a variety of structural changes, was accepted, and on receipt of a proposal from Mr. Richardson to complete the court-house according to the modifications proposed in the report, the following resolution was passed by a vote of sixteen to six:—

Resolved, That the Court House Building Committee are hereby instructed to prepare a contract with William D. Richardson for the completion of the Court House upon the basis of their report to-day in such manner as shall seem best to them and their attorney, and for the best interest of the county, reporting the same to this Board for their consideration as early as possible.

The proposal submitted by Mr. Richardson was to rebuild and complete the structure for $46,000 in addition to his contract, which would raise the whole cost of the building from $160,000 to $206,000.

THE list of faults which the report of Gen. Smith and his committee finds in the construction of the court-house as Mr. Gay planned it is certainly a startling one; and if the judgment on which it rests carries the weight to which we believe it to be entitled, it is a very damaging one. The way in which the dome of the main pavilion was to have been supported is known to whoever has read the accounts of the fall. The report blames also the construction of the side pavilions, carried above the corridors on insufficient iron beams, and supported on inadequate bearing-stones, which would, says the report, have transmitted to the brick-work a pressure of sixty tons to the square foot. The groined arches over the vaults, it says, have no sufficient abutment, and there is nothing to resist the thrust of the semi-dome; the iron beams rest on the walls without bearing-plates and without anchoring. The stringers of the iron staircases are not strong enough, and the platforms and steps of the main entrance, being improperly supported, are already broken. It would appear that in the report, which we have not seen in full, all these defects are ascribed to the planning, and not to the way in which the work was done by the contractor. The report proposes to diminish the bearing of the side-girders of the dome from twenty-six feet to ten and a half, by supports of brick-work, and by setting the roof-girders and those of the dome on the same level (which was not the first arrangement), to get continuous bracing across from wall to wall in both directions; the brick piers which gave way are to be replaced by stone ones; two eight-inch beams under the side pavilions are to be replaced by three fifteen-inch ones; bearing-plates and anchors are to be provided for the iron beams, abutments for the arches, ties for the semi-dome, etc. These are the alterations which are included in the new accepted estimate of the contractor. When it is remembered that, according to the report of the committee of experts, of whom Gen. Smith was one, the fall of the building was accelerated, if it was not occasioned, by the vicious execution of the masonry, this innocent confidence of the Board of Supervisors in their contractor is astonishing. We may presume that Gen. Smith, who has been instructed by his examination of the fallen building what kind of masonry is to be expected from him, and who in this respect at least has the advantage of the architect, has not failed to make use of his knowledge, and plan his supports accordingly.

THE quarrel over the Philadelphia City Buildings has led at last to some rather curious litigation. Our readers will remember the long discussions and investigations that were undertaken some little time ago on account of complaints that were made of the cost of the buildings, and against the execution of the marble-work upon them under the contract of the Messrs. Struthers. The city council of last year, dissatisfied with the showing that was made in answer to these complaints, and stimulated by the pressure of tax-payers induced by the necessities of hard times, left the building commission and the contractors in the lurch, refusing to pass the appropriations demanded for continuing the work. By the act of assembly passed in 1870, which authorized the construction of the buildings, and appointed the commission, this commission was directed to present before the first day of December in each year (so as to be in season for the adjustment of the annual taxes which is made in that month) a requisition for the amount of money which they should need for their building operations during the year ensuing. The city councils on the other hand were ordered to levy a special tax to raise this amount. We do not know what was the *animus* of the assembly which passed the act over the heads of the councils; but it apparently transferred all the power in the matter to the commission, which is a closed corporation, and left to the councils only the ministerial function of levying the tax which the commission called for. On the strength of this act the commission has applied to the court of common pleas, citing the provisions of the act and the fact that they, the commissioners, made requisition on the city councils in November last in due form for an appropriation of a million and a half of dollars for this year's work, which requisition the councils refused to honor, and praying the court to require the councils by the issue of a writ of mandamus to make the required appropriation or to show cause for their refusal.

THE points raised by the city's attorney in his demurrer were that the city funds ought to be controlled by the representatives of the people duly elected, and not by an irresponsible commission; and the other, to the lay mind more relevant, that the lawful time for making this year's appropriations has passed, and that the city councils, re-organized on the 1st of January, are for such a purpose *functi officio*. It is also argued that the constitution of 1874, by vesting the control of the public moneys absolutely in the councils, has superseded the act of 1870 so far as that gave independent authority to the commission. The attorney quoted from this constitution the section which provided that "no debt should be contracted or liability incurred by any municipal commission except in pursuance of an appropriation previously made therefor by the municipal government;" a provision which, he said, was expressly intended to curb the powers of the very building commission now in question, and was so understood and accepted at the time. He further raised the point that the proper persons to apply for aid from the court in this case were not the commissioners but the contractors, who claimed that money due them under their contract was withheld. At our time of writing, the decision of the court has not been received. The contractors, Messrs. Struthers and Son, have already a suit against the city for warrants drawn in April last to the amount of forty thousand dollars against appropriations already made, which warrants the city authorities have re-

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fused to pay on the ground that the work was not satisfactory. The impression which we received, and we presume our readers also, from the discussions of last winter, was that though the work done by Messrs. Struthers was not unimpeachable, it had been accepted by proper authorities who duly represent the city for that purpose; and if that is the case, it is hardly to be expected that the city should be sustained in refusing to pay for it according to contract. It is by no means an uncommon thing for communities, as well as for individuals, who have delegated their authority to others, to wish to disown the acts of these others and escape their consequences when they find them distasteful; but it is decidedly *contra bonos mores*.

THE winding up of the Centennial Exhibition has been marred by an unseemly collision between a representative of the United States Government, and the authorities of the park at Philadelphia. The slowness of the Government in removing the buildings which it had built and used for the exhibition had annoyed the Park Commissioners, who are anxious to restore the grounds to their old condition; and a short time ago they issued a notice to Lieut. Metcalfe, the United States officer in charge there, that the building which he occupied as an office must be taken down within five days. The notice was not communicated to Lieut. Metcalfe himself, but was posted in hand-bills, setting forth that if the building were not taken down in five days it would be removed by the Board of Finance. It was a small portable building of wrought iron, its cost about twenty-five hundred dollars, which the Government intended to remove to Augusta, Me., and re-erect at the Kennebec Arsenal there. Lieut. Metcalfe, on being informed of the notice of the Park Commission, sought out a contractor to remove the building, and had telegraphed acceptance of his proposal on the last afternoon allowed by the notice. The next morning when workman of the contractor were already on the ground, says Lieut. Metcalfe, a gang of men under direction of the Park Superintendent ejected the workmen and attacked the building, "wrecked it completely, breaking windows, smashing doors, and finally pulling down the entire wrought iron frame in a shapeless mass." The Attorney General, it is said, has instructed the District Attorney to take the proper legal steps to protect the interests of the United States in the matter. What such steps may be we do not know. We presume the Park Commissioners will be held liable for the destruction of the building in pulling it down. Their statement is that they gave no order for its destruction, but only that the superintendent should enforce their order by beginning on some unimportant building of the Government. The thing to be regretted is not the loss of the building, but that the record of such an undertaking as the Centennial should be marred at the end by a petty quarrel between the Government and the city. It is difficult and thankless to search out the merits of such quarrels; but we all know that the cases are very few in which they cannot be avoided without loss of dignity if even one of the parties concerned is resolved not to accept them.

THE building disaster that comes to our notice this week is exceptionally innocent, in that it was accomplished without loss of life. It occurred in New York a few days ago. The proprietor of a dram-shop in the basement of a tenement-house on Twenty-third Street noticed, one evening at dusk, that the party-wall between it and the next was settling visibly. He alarmed the occupants of the house, and hurried to get assistance from the nearest police-station. The police had just time to drive the inmates from this and the adjoining house, — some of them being very unwilling to move, — when both houses crumbled to the ground. There were some forty families living in the five stories of the houses, which were built each for four tenements on each floor; and if the fall had occurred in the night, there can be no doubt that a good many persons would have been killed. The curious thing about the fall was that in the lower story where the settlement was first noticed, the wall was seen, as it were, quietly sinking into the earth, without at first alarming the people in the upper stories. A part of the building stood upon a marshy hollow, which was carelessly filled when it was put up, and through which the water constantly came into the cellars, doubtless softening the foundation of the wall which fell. The houses had been reported unsafe, and cleared, some seven years ago; after which they were repaired and re-occupied. A long investigation is going on in Boston over a tenement-house which burned a short time ago, with loss of life to some of the occupants because the only staircase in it was the first thing to take fire. The result of investigation seems to be to show not only that the building was dangerously planned, but that it did not conform to the building-law, and that it had not been rigorously inspected, as was doubtless the case with that in New York. The Boston inspector complains that he has not force enough in his department for all that it ought to do, which is probably true; but the building-laws themselves are in need of overhauling in both cities.

THE New York Society of Decorative Art, of which we made mention some time ago, continues preparation for its work with activity and judgment. Its published prospectus announces its purpose to establish an exhibition and sales room for the wares which it means to encourage, which include sculpture, painting, wood-carving, lace-work, needle-work, and "decorative work of any description done by women," which shall be thought good enough; also, to make arrangemens with potteries for the improvement of the design of their wares, and to bring the society into communication with dealers in the various materials used in decorative work; and finally, what, if it can be accomplished, will be worth all the rest, "to induce each artist to master thoroughly the details of one kind of decoration, and to try to make for her work a reputation of commercial value." The society, it is said, has called in the aid of artists of mark for the establishment of its undertakings, and looks to the ultimate establishment of a school and museum after the South Kensington manner. It will be seen that it does not stint itself in work. The standing and character of the ladies who compose the society are indications of earnestness and judgment which will give the movement the right impulse, as well as of the social influence necessary for the best chance of success; but any movement of such a kind, whatever its vogue, must necessarily win its real successes slowly.

THE proposal to enter into relations with the potteries seems to us a specially opportune one. The Centennial Exhibition showed that the potters of the country were beginning to be aware of their shortcomings and their opportunities, and what they saw there must have opened their eyes a good deal. The same exhibition showed that the women of some of our large cities were busying themselves with success in the decoration of pottery; and the wish to see these two things work together was an inevitable one. Our women are doing a great amount of this sort of decoration for themselves, — a work which by its lightness and neat-handedness, as well as by its prettiness, is peculiarly well suited to them, — a good deal of it cleverly, and some of it skilfully; and when we take into account with this the rage for all sorts of "ceramics" which now transfuses the country, it would seem as if all the elements of success were in favor of our potters. But behind the decoration there is the difficulty of form; and any one who has tried to inoculate into even the best workman in our potteries a perception of the difference between a good form and a bad one, or between a fine one and a coarse one that looks tolerably like it, will know what this difficulty means. We are glad to infer that the society includes this as one of the things to be accomplished. Perhaps a still more desirable thing is the resolution which the society is said to have taken to patronize not only female but male workmen. The reason given for this is the fear that if the work offered for sale by the society is known to be women's work only, it cannot be made to command so good a price in the market as men's. Be this as it may, a stronger argument to our mind would be that the admission of male competition will be pretty sure to have a strong influence in raising the standard of the work, both from mere emulation, and because the men whose work is included will be likely to be men whose permanent occupation it is to do such work, while with the women alone it is likely that too much of it would be only the resource of leisure, or the temporary employment of a few years.

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THE SHAPING OF TOWNS.

THE effort that is making for the systematic improvement of the town of Williamstown, of which we spoke a week ago, is in its systematic character and breadth of aim so unlike what it is common to do in management of towns, and so suggestive of the kind of forethought which might be used to improve the condition of almost all of them, great and small, that it tempts one to moralize on the neglect under which most of our towns are allowed to grow up and the inconsiderateness with which they are planned. The subject is one that concerns every person in the community, and yet one of which nobody ever thinks; while the evils that result from the neglect of it are very serious, and often entail an unpardonable sacrifice not only of natural beauty, but of permanent convenience. A heavy burden of expense is often the result of sheer neglect to provide in advance for the most obvious needs; and all travellers can point to towns in which natural opportunities have been recklessly thrown away or natural beauties perversely sacrificed. The greatest enemy is private "enterprise," which for the sake of momentary advantage and under guise of personal liberty is often allowed to entail ruinous injury upon neighboring property, and upon whole towns permanent deformities which it would seem that a tolerable forethought and a reasonable exercise of public authority were sufficient to prevent.

It falls to Americans as to no other people in the world to take the responsibility of deliberately laying out their towns. Every year sees some new one founded, which soon accumulates a considerable population; and the experience of older cities, showing how difficult it is to cure the evils of faulty growth when towns have become large and densely built, ought to teach us to be careful not to so plan them that they will by and by have to be replanned. It is not only the old cities of the world, which grew into shape under a different civilization from that of our day, that have been obliged to undertake very serious and expensive changes to suit them to modern uses. American towns which in comparison are the children of yesterday have hardly reached a mature growth before it is found that much of what has been done in laying them them out has to be undone, and that much of what cannot be undone is permanent injury. The city of Paris is a standing example of the appalling expense that may be incurred in adapting an old city to modern uses. It is true that the changes of centuries in the ways of civilized life are not to be forecast; but the experience of two or three generations in American towns shows that costly alterations have constantly to be undertaken which a reasonable forethought might have provided for in advance. Chicago had hardly become a town of some importance when it was found that to get even a tolerable drainage, it would be necessary to raise the level of a great part of it by several feet. The inhabitants with characteristic enterprise undertook the work as soon as they saw the need of it; but already, we believe, they wish it had been carried further. In most cases it is the natural characteristics of the sites that determine the changes that have to be made at last; and these characteristics can be as fully seen in the beginning as at the end. These and the means and directions of communication with their surroundings compel in a great degree the ultimate form of any city. A considerate observer could have foreseen a hundred years ago, as well as the inhabitants see it to-day, that the town of Boston, with its close connection with Charlestown on the north, and its access from the main land by the neck on the south, would absolutely require a great continuous thoroughfare from one of these regions to the other: yet it is only within two or three years that such a thoroughfare has been carried out by expensive alterations of the oldest part of the city. New York is a marked example of the irresistibly controlling influence of situation. Set as it is on a long narrow island, a fine harbor opening down from the southern end, and with a deep water-way on the east and west sides, it was a foregone conclusion that if it grew to be a large city the shipping and commerce would advance up its sides, and that as fast as this happened the tide of business would fill its narrow width from river to river, rising to the upper stories of its houses, and drive the residences northward before it. It was inevitable that the main avenues should run north and south, and that the residence quarters should steadily retreat to the upper end of the island and to the main land. In fact, in that city there were but two or three things in which the inhabitants could fail to obey the necessary laws of its growth, and could go wrong. In two of these they did go wrong. One was in the provision of a proper system of sewerage, of which in spite of almost unequalled advantages in the disposition of its surface New York made a wretched mess; and the other in not reserving means of quick railway communication from end to end of the island. A third critical matter was the reservation of proper breathing-space in the form of a park; and here the people of the city were wise enough to take the thing in hand just at the right time, and provide themselves with a park, ample, well placed, and unspoiled, that will always be priceless to them.

It is not often that the position of a town so imperatively dictates its plan as does that of New York; but it is less often still that there are not some determining influences in its topography which will greatly control the manner of its growth, and which ought to have careful study in laying it out. Chicago, for instance, has probably as neutral a site as can be found in any city of consequence: yet there the position of the lake shore and of the forked stream that divides it, the directions of the great lines of communication with other cities and with the producing regions of the neighboring country, are enough to have fixed the leading points in the disposition of the town, and probably enough, if they had been carefully studied, to give indications for a much more convenient planning than the present. It is only in such towns as are dropped at random upon the flat and featureless prairies along our western railroads that the natural surface has no advantages which deserve study; and even then the winds and the sunshine remain to give their hints. But in the ordinary course of civilization, such characterless sites are not the ones to which populations cleave. Some convenience of access by a natural highway, or some advantage of ground, or sometimes mere beauty of position, determines the placing of a city. The directions of the valleys or ridges which form highways or barriers, the points at which routes reach it from different directions, every slope of a hill or curve of a bluff, the directions of the winds and of the midday sun, all these are elements which should be taken carefully into account, and may give valuable suggestions to serve the convenience of business and residence, or if not these, still the high convenience of beauty. But the surveyor who lays out a new town cares for none of these things. He plots his rectangular streets, so many to the mile, on a sheet of cross-section paper, and applies them to his site. If elevations and slopes come in the way of his right angles or his grades, he pares off the hills and fills up the plains till he has a *tabula rasa* to work upon. The popular idea of a model town is one all whose streets are at right angles and whose whole territory is as flat as a floor. Now, leaving beauty out of the question, in spite of certain manifest small advantages a rectangular town is not, on the whole, a convenient town, and involves in the aggregate an enormous waste of time in going round long corners to get from one point of it to another; and a flat town is, other things being equal, an unwholesome one.

When towns are left to grow up wild, as most of our older towns have grown up, they naturally adapt themselves to their circumstances, and are seldom without a considerable degree of both convenience and picturesqueness. They are nevertheless subject to all sorts of untoward accidents, and very likely to be permanently injured by distorting their growth to suit momentary and unimportant exigencies, or in favor of private schemes. Instances are many where the best parts of a town for residence or for business uses have been allowed to fall into squalid degradation, to remain a permanent disfigurement and injury, or to be afterwards reclaimed at wasteful expense. It is but a few years since London recovered at great cost a part, and only a small part, of her river-front in the very heart of the city from dirty inaccessibility. The rest is still a disgrace to her. She is now attempting to open a new avenue in the same neighborhood to connect two of her most fashionable and busiest quarters, — Oxford Street and Trafalgar Square, — but to do this she must cut through one of the vilest quarters of the town, the famous parish of St. Giles, which yet defiles this favored region. All our readers will remember instances where some speculator has permanently injured

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or ruined a desirable neighborhood, or where a few dirty cabins, inconsiderately allowed a lodgement, have repelled the better residents from the finest part of a town, and permanently devoted it to filth and neglect. Most of our cities sooner or later wake up to the fact that they have missed their opportunities, and allowed things to go wrong which they have got to set right at an excessive cost, unless indeed they are frightened away from all attempts at improvement by the difficulty of it. And finally, when they do set to work, they do a little bit here and a little bit there; one administration undoing what another had begun, or passing to a different scheme, or else the authorities stand at bay amid the attacks of a hundred private interests, all clamorous for different things, till the labor of improvement becomes herculean.

These difficulties could be in a considerable measure guarded against if they were looked out for carefully and continuously. A great proportion of the annoying things that have to be undone, and the still more annoying things that cannot be undone, might be prevented. Unhappily, since what is everybody's business is nobody's business, there is no one to look out for these things. Under strong permanent and personal governments such things are provided for; it will be one thing more to the credit of the habit of local self-government when they are cared for among us. The whole subject of the distribution of people in towns, their means of transit, their thoroughfares, parks, places of recreation, regions of business and residence, deserves serious study, and should no more be left to the mercy of accident than should draining or lighting; but it has been almost entirely neglected. It is a matter which it seems to us might well be the special charge of distinct officers, commissioners, conservators, or what not, who should be beyond the reach of party influences or frequent change, and who should be specially trained to watch over the growth, development, and improvement of their towns. If the grading, drainage, paving, cleansing, and policing of towns are worthy of careful and systematic control, so are also the general shaping of the towns, the preservation or destruction of the natural features of their sites, and the distribution of their population and residence. Just what are the proper limits of public interference in such matters is a political question upon which we cannot venture; but public neglect has shown itself to be both costly and pernicious.

STUDIES OF INTERIOR DECORATION.

XI.

CONCERNING FURNITURE. — III.

IN Plate VIII. of our series, for the sake of illustrating the thesis that the various styles should be regarded by the modern designer as the natural language of art to be used, not only without exclusions, but with the utmost freedom consistent with congruity, we ventured to present a parallel of designs, one in French Renaissance of the sixteenth century, the other in modern Gothic, both designs having similar divisions, dimensions, purposes, and general character, but differing in the manner of expression; the choice between the two manners being governed not by fashion, nor by any dogma of art, but solely by their adaptability to the scheme of decoration of which the cabinet in question is to form a part.

The two cabinets thus brought into immediate comparison are fundamentally different in every point of expression. That of the sixteenth century is a correct architectural composition; the mouldings are well profiled and combined; and the whole bears the mark of just the kind of study which the architects of the period bestowed on the details of their buildings. The school in which it was designed inherited and cherished certain fixed traditions of ornamentation; these are very conventional in character. The whole *motif* of the cabinet as a decorative composition is the adaptation of a rich and pompous architectural order. The designer was not hampered by any principles of high art: he aimed to produce a composition pleasing to the eye, and he was seconded by carvers who learned their art in the school of Jean Goujon, Bachelier, or Philibert de l'Orme. The modern English designer, on the other hand, first considers how his cabinet is to be constructed; he must, by his treatment, make manifest to the eye all the details of his joinery; this is his first thought. Every joint must be plainly confessed, and every part must have its function distinctly declared, not only by its form and by its position, but by its ornamentation. He avoids mitred joints, and stops his mouldings square against the frame. The structure must not only be strong, but it must appear so. How the doors of his cabinet are to be made, how they are to be connected with the frame, how they are to swing, — these considerations are paramount. His panels he treats with a flat inlay of woods, because he desires to draw attention to the fact that they are thinner than the styles. The styles of the panels, and the other parts that do the most work, are kept plain in order that the rest may seem richer by comparison. In the profiling and embellishment of his mouldings he follows no conventional or consecrated forms. He acknowledges, in short, no *order* but that of truth of construction.

In imposing upon himself these conditions the modern English designer professes to follow the principles which he believes controlled mediæval work, and which should control all work of good art, and he has hitherto naturally confounded with these principles the characteristic forms and details by which they were originally expressed. It is not to be assumed however that any of the modern work conceived in this spirit could possibly be mistaken for old work. This is forbidden not only by the nature of the practical requirements which such designers are called upon to fulfil, but by the modern spirit of design and workmanship which cannot fail to manifest itself in a hundred different ways. Even Burges, the most learned and the most skilful of all the iconographers and archæologists in the profession, who has pushed archaism and the affectation of rudeness of form to the greatest extreme in his designs of furniture, betrays himself by the very completeness of his knowledge. The *naïveté*, the unconscious excellence of old workmanship, is not to be imitated save perhaps by a fortunate blunderer, much less by a master who has filled himself with the spirit of it.

If therefore modern efforts to imitate old work and revive old styles defeat themselves by reason of the very perfection of our knowledge of such work and such styles (and indeed of all work and all styles), the conclusion is obvious that such efforts are misdirected, and that the proper use of our familiarity with precedents in various styles is not to imitate the form, but to imbibe the spirit of them, to the end that our means of expression may become more elastic, more copious, and better fitted to meet the infinite demands made upon art in modern times.

In further illustration of the use of precedents according to the modern spirit, it seems to us instructive to present in Plate IX. two chimney-pieces of the Jacobean era, (1) from an old house at Bow, and (2) from Holland House, these being taken from Richardson's "Architectural Remains of the Reigns of Elizabeth and James I.;" and to compare with these we reproduce in the same plate a Neo-Jacobean chimney-piece by Bernard E. Smith, published two years ago in London, and a fair specimen of modern reproductions. Mr. Smith's book of designs in this style is, we are glad to see, to be republished in this country, the first part having already made its appearance.

This book[1] naturally followed on the revival of the architecture of the seventeenth century in England, to which we have had recent occasion to refer, and of which the first signal was given by Mr. Norman Shaw, in his New Zealand Chambers, several years ago. This revival has been since developed by the younger members of the profession with an energy so persistent and defiant that the Neo-Gothic which has pervaded the work of the last twenty years seems to be steadily becoming a thing of the past. In fact, —

> "The teacup times of hood and hoop,
> Or while the patch was worn," —

have in a certain sense come back to us, and surprised the nineteenth century with a new masquerade. We are in the midst of it; and the soberest among us must needs bow down before the shrines of old china, and rummage among the red-brick manor-houses, decorated by Grinling Gibbons and Chippendale, for *motifs* in furniture suited to these new and strange conditions.

Under these circumstances any intelligent designer who has taken the trouble to rescue for our use what good things may be hidden in the dusty oblivion of those old garrets is to be cordially received. Mr. Smith's researches have not been without fruitful results, as his thirty-six well-filled pages of drawings abundantly testify, — the last of them, however, professing to obtain their inspiration from an era of English Renaissance so late and so unpromising as that of George II. As is proper and to be expected in work of our day, these designs are not mere reproductions: they are rather adaptations full of intelligent anachronisms, presented in a series of rapid sketches, remarkable for vigor, spirit, and dash, and, though perhaps inferior to the designs of Talbot in finish, careful workmanship, and abundance of detail, are none the less useful and suggestive. It is worthy of note that these sixty or eighty designs are merely variations and combinations of not more than a dozen chosen *motifs*. These *motifs* are mainly turned and square-moulded posts, miniature galleries, niches, and balustrades, overhanging canopies or covings, slender mouldings, square and interlacing panels decorated with garlands, or with the conventional flower-pots, holding foliage culminating in the formal chrysanthemums and sunflowers of the epoch; and these conceits are used in various combinations of shelves, drawers, and lockers, mainly for

[1] Designs and Sketches for Furniture, in the Neo-Jacobean and other styles. By Bernard E. Smith, Architect, published by S. M. O'Neil, and for sale only by E. Keating, 1071 Washington Street, Boston. Reproduced from the latest London edition by the chemical engraving process. R. H. Mandel, Boston, May, 1877.

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the accommodation of blue china and other bric-à-brac. For the wheels of Fortune and of the potter have combined to revive this old fashion for our times. There are occasional surface decorations with tiles, and backgrounds of stamped leather; but there are no defined orders of architecture with fretted pilasters and entablatures, such as are indicated in Plate IX. and such as we frequently see in the real cabinets of the Jacobean period; and the chairs and tables, although evidently more sound and truthful in construction, do not have the great legs — fluted, bulbous, or twisted — and the prim quaintness of detail, by which the authentic objects are mainly commended to the archæological taste. The author, in short, will not forget the strict limitations of the Neo-Gothic school; and we look in vain in these designs for that play of outline produced by the consoles and brackets, the scrolls and urns, the broken pediments and pompous frontispieces, the heraldic mantlings and scutcheons, which certainly characterized his prototypes. With the exception of a few hanging wall-cabinets of graceful composition, his designs are bounded by very square and precise outlines.

It is very curious to see the modern English eclectic spirit, with all its resources of precedent, imposing upon itself this conscientious restraint of form. Evidently self-denial of some sort is the greatest virtue that can be applied to eclectic design, and although the result may be less correct and less acceptable from an archæological point of view, the discipline of it is wholesome for the artist. What may be accomplished as regards furniture in the exercise of this virtue may be seen in Mr. Bernard Smith's designs, any one of which would be a fitting accessory for an interior scene in "Henry Esmond" or "The Virginians," but really contains nothing to offend the taste even of a purist of the modern Gothic school.

This so-called Neo-Jacobean style therefore, according to Mr. Smith, is not really a revival, but simply a contribution of a new set of *motifs* much needed to give variety and greater scope of expression to the theory of truth of construction as set forth in the Neo-Gothic school. It is simply an addition of certain devices of turned posts, balustraded galleries and classic mouldings, to the notched chamfered edges, the colonnettes, the cuspated arches and panels, and the other over-used details of the "Eastlake furniture." The book in short presents to the student of design a fair example of how styles may be mixed in these modern days without any necessary incongruity.

The descendants of the New England Puritans cherish here and there in their households some curious chair, some odd brass-bound desk, or bandy-legged cabinet, which, it is claimed, "came over in the Mayflower." These are specimens of genuine Neo-Jacobean furniture in the later stages of the style, when Flemish and Dutch traditions had begun to have their influence on English cabinet-making, carving, and joinery. In a modern room these precious heirlooms do not pretend to contribute to its beauty; they are curiosities and not works of art. But to the artist they possess a peculiar interest in giving him a new idea, a new sentiment of form, which it is his business and privilege to incorporate among his available resources of design with others fetched from the industry and art of all ages and nations. Out of this storehouse should be developed the rational furniture of our time, not out of whims and fashions.

THE ILLUSTRATIONS.

THE THOMAS CONCERT GARDEN AND HALL, NEW YORK CITY.
MR. A. H. THORP, ARCHITECT.
(860 Broadway, New York, N.Y.)

IT is intended to construct the greater part of the building, and particularly the lower portion with its shops and passages and also the garden, principally of iron and glass. Other fire-proof material will be largely used for the restaurant and auditorium on account of acoustic and other obvious reasons. The garden and auditorium floor will be of cement supported on a network of light open-work iron arches, which will themselves be supported by a forest of iron columns, resting on masonry foundations under ground.

The first story will be divided as indicated on the plans into shops opening on either side of *passages*, as they would be called in Paris, which will traverse the whole square, two of them diagonally from corner to corner, and the other directly through the middle of the square from east to west. These passages will be about 20 feet wide; and the average size of the shops, of which there are about 140, will be about 15′ x 25′, many of them being much larger.

The height of this story, the cement floor of which will be on a level with the sidewalks, will be about 23 feet. In order to give ample light and air to the passages and shops, the latter will be carried only to a height of 13 feet, the remaining 10 feet above the ceilings of the shops being reserved throughout the whole extent of the square as a free space for light and the circulation of air, which can be governed by the opening or closing of windows around the outside of the building, these windows being under the control of the janitor. The partition-walls which divide the shops from one another will be of 8″ brickwork or of some other fireproof material for seven feet of their height, while the remaining six feet will be of thick ribbed glass set in ornamental iron frames. The fronts of the shops will be of plate glass, and the ceilings will be of ordinary glass set in light iron frames, which opening at will, will admit fresh air. Thus it will be seen that in the whole height of the first story the only obstruction to the penetration of light into the interior passages and shops will be the lower portion of the partition walls; hence it is believed that there will be abundance of light, even without the introduction of illuminating tiles over the passages, as indicated in the garden and auditorium plan.

The large stairways conducting to the garden and auditorium will open from the centre of the square at the intersection of the passages; and although there will also be direct communication with these stairways from the side street for the convenience of people coming in carriages, still the large mass of people visiting the concerts will find it easier and more direct to take the central entrances, thereby converting the passages into thoroughfares to the advantage of the shopkeepers.

The garden part will be covered with a glass and iron dome, and will in fact be a vast conservatory, in the construction, ventilation, lighting, and heating of which advantage will be taken of the experience gained in the numerous existing conservatories and *jardins d'hiver* such as the one recently attached to the *palais du roi des Belges*, and others in France, Germany, and Russia.

The outside will be a continuous series of windows that can be opened to a height of about ten feet, thus throwing open the entire garden to the air. The garden and auditorium will be separated by a light ornamental iron and glass screen, the open portions of which will be determined greatly by acoustic requirements as will also the construction of the entire auditorium, which having ample floor space, will be arranged with a view to the greatest possible comfort of the auditors. The rooms reserved for restaurant uses will be the largest in the city, and will be directly accessible from the street as well as from the concert-hall. Moreover there will be a hall for piano recitals, capable of seating about five hundred persons, and numerous rooms for chorus singing, orchestra, private offices, etc.

The architect is confident from several estimates he has received, which will soon be published, that the building can be constructed for $500,000.

HOUSE AT WINCHESTER, MASS. MR. GEORGE D. RAND, ARCHITECT.
(15 Pemberton Square, Boston, Mass.)

This house is one of several recently built by Mr. D. N. Skillings on his estate in Winchester, known as "Rangeley Place." The estate embraces about twenty-five acres of diversified hill and vale, wood and lawn; and the plan has been to treat it after the manner of a park, without public streets or fences to destroy its breadth or privacy. The result thus far has been eminently successful, and seems worthy of imitation in other instances.

DETAILS FROM THE HUNNEWELL BUILDING, BOSTON, MASS.
MESSRS. STURGIS AND BRIGHAM, BOSTON.
(12 Exchange Place, Boston, Mass.)

STUDIES OF INTERIOR DECORATION. PLATE IX.
See the article above.

ARCHITECTURAL PROGRESS IN BOSTON. — II.

NEWPORT, R.I.

THERE was one other style of architecture that found favor early in the last century, — that employed by Wren in making good the losses by the great fire in London, and which still may be seen in the churches and other public edifices in that city. A type of it may be found in Christ Church, Boston, St. Paul's and St. John's, New York, Trinity Church, Newport, St. John's and Dr. Hall's Church, Providence, and in other places, each having a distinct character, but there is an element running through them all by which they are easily recognized. They were by far our finest churches up to a comparatively recent date. We may well wonder that architects, with models before them so vastly superior to the Greek temple for structures they were daily called upon to design, should have given so little attention to them.

But in time there came a change, a breaking away from the classic, and, for that matter, from all rules; but whether for the better may be questionable. Instead of rigidly adhering to old formulas, there was a disposition to take the greatest license, and wholly ignore architectural precedents, as is shown by the following extract from the *Transcript* of just twenty years ago: —

"The book architect says, 'You mustn't use this or that feature: it's contrary to the rules of the pure Greek, or the pure Gothic, or the pure Renaissance.' — 'Pure fiddlestick!' says the Yankee; 'you say that won't do. I'll try and see. You say that design there is meant for a base: now I think it would look well turned upside down for a cornice. I guess I'll try it.' Accordingly a conspicuous building on Summer Street has such a cornice. The experiment, to be sure, is not strikingly successful."

Buildings erected by men who held these views may be seen in almost every city, and it is not necessary that I should specially

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refer to them; they are passing away, and will not be missed when the last is razed. The Bostonians were not long in finding that this style of building was not the best; and in their effort to improve upon it, they turned to the Renaissance, taking for a model the façade of the Tuileries. That the Louvre is a wonderful storehouse of art we are all free to admit, for it is enriched with the works of Lescot, Bernini, Perrault, Fontaine, and Visconti; but to give us its forms piecemeal, and that too without its sculptured accessories, is to emasculate it, and leave us with the feeling that we have but a feeble reproduction of a great original.

Between these two extremes Boston was vibrating when the fire broke out; the leaning being to forms marked more by solidity than by any other quality. The architects, at least the younger members, were trying to shake off the trammels that bound them, and occasionally there could be seen the cropping out of something better, particularly in the churches and the dwellings; but the growth was slow, for that rigidity, that tenacity in holding to old notions, one of the characteristics of the Bostonian, yielded but gradually to the effort to supplant it. But the fire came; new buildings were wanted; there was no time for disputation; and the architects, equal to the emergency, have from that time instilled new life and character into its architecture.

There is much that is difficult in city architecture. A detached building affords far greater facilities for producing a pleasing effect than extended blocks of brick and mortar; the lights are not restricted to the ends of the building; opportunities are afforded to break the sky-line, and there are no abrupt terminations to disturb us by their want of continuity. Then too there is often the loss in a city house of a visible roof, a feature that no building can afford to do without. Nor are these the only difficulties an architect has to contend with. Every owner of a city lot with a frontage of five and twenty feet wants the structure that he raises, whether a store or a dwelling, to be unlike that of his neighbors; and if he cannot get this without departing widely from the accepted type, — large voids between narrow piers, story above story, — he will attain it by pushing his walls up higher than his neighbors'. It matters not what the effect will be: he wants it so, and so will have it.

One of the first things that attract the attention of an American in Paris is the general uniformity in the height of buildings, which is governed by the width of the street. But the architecture of Paris, with all its studied details, its profusion of ornament, lacks variety in that it is confined to one school — the Renaissance. We tire of it as we would tire of salmon, venison, or *paté-de-foie-gras*. We like rich viands occasionally, but we do not care to live on them; we want variety, have long wanted it of a healthy tone; and now that we begin to get it are the more earnest to secure it in full measure. The Greek temple is obsolete, and so is the style that Wren and Gibbs and Hawksmoor made popular. If in place of them we introduce some of the elements that marked the best periods of Venetian art, and the sterling traits of the mediæval, we shall be the gainers. This is what Boston is endeavoring to do. She is aiming to get purity of form without resorting to the Palladian, and the best qualities of the French Renaissance without reproducing the Louvre. The Venetians were the first to adapt the architecture of the Eastern Empire to the wants of a later day; and while they preserved much of the Byzantine without wholly rejecting the classic, they so modified it and brought it into line that it will serve us as well as it served them. But they were not servile imitators, nor should we be. We may thank them for their suggestions and their interpretation of what was antique in their day, but we cannot follow their lead mechanically without loss of confidence in ourselves and of all individuality.

If we could only restore the little Greek temple that up to a few years ago, stood on the corner of Beach and Washington Streets, and contrast it with the structure a block removed, on the corner of Essex and Washington (occupied in part by the Boylston Bank), we should see and understand more fully the truth of what I have said. In the old building, which was long given up to the sale of small wares, there was not a thought beyond the baldest repetition of a stereotype form; not a vestige of feeling, not the slightest attempt to do more than reproduce that which had been done over and over again, hundreds and hundreds of times, just as the porticos of the Court House and of the Tremont House are exactly alike in design. But when we turn to the modern building to which I have referred, we see the change that has been wrought, and begin to understand the advance we have made. Instead of cold formality we have feeling, and in place of a blind adherence to an old type, thoughtful study and a reaching after something higher and better. There is more thought and more feeling in a single string-course or a corbel of that building, than in the whole conception of the old classic structure that has so recently passed away. And as the eye runs up the façade and takes in the variety in its ornamental work, the relief secured without excess, and the delicate mingling of colors in its walls, we feel that we *are* progressing, and that there is hope for the future. I do not know the architect, even by name.

But my purpose was not to cite examples, or to go into any details in regard to the changes that are observable in the architecture of Boston, but simply to note the improvements that have been quietly going on in that city. Her architects have dared to think, and happily they have found clients willing to trust to their guidance. If they have erred in some things, if to a building already profusely ornamented gilding has been added, this, like other questionable expedients of the over-zealous, will correct itself. They have done more that is really good in a given time than we could have looked for; and while they have yearned for a better style of art, they have resolutely set their backs against shams. For this let us thank them. CHAMPLIN.

CORRESPONDENCE.

NEW CHURCHES. — THE NEW CAPITOL AT ALBANY. — THE NEW SUPERINTENDENT OF THE POST OFFICE. — ANOTHER BUILDING ACCIDENT.

SEVERAL of the New York architects are busy on church plans. In fact, the bulk of work now in hand is connected with church extension or provision. Mr. J. C. Cady has a church at Morristown, if any thing, an improvement upon his Bridgeport design, of which every one has heard, though but few have seen. Cyrus L. W. Eidlitz, the son of Mr. Leopold Eidlitz, architect, has entered upon professional life under his own name, and in his first design, a stable for Mr. Boardman at Poughkeepsie, has produced a novel and successful treatment. It is an open timber construction, the sills, plates, and main diagonals being of oak with the bark left on. Mr. Eidlitz is now busy on a renovation of St. Peter's Church at Westchester, just without the city limits. This church was originally erected in 1852, from designs prepared by Mr. Eidlitz, sen. At that time it was a very unpretending structure, with a wooden construction within. In December last it was burned out, the walls alone standing. The new design will introduce a clerestory, will enlarge the chancel, give a complete stone construction within, all covered by an open timber roof, as shown in your last number. The wall above the chancel arch, and that also above the arch extending across the nave at its intersection with the transept, will be pierced, giving to spectators in the nave a view up into the roof of the chancel, where the height will equal that of the nave, the ridge without forming a straight line. The columns in the church are of polished red granite. Dorchester stone and buff and red brick will be extensively used. The cost of the changes will reach $50,000.

Mr. E. L. Roberts has a small church to be erected at Sing Sing, 90 x 57 feet in size of auditorium, but with schoolrooms and lecture-rooms at rear, bringing the full ground plan up to 148 x 61 feet. It will be in Belleville stone, in plain simple Gothic forms. A tower 134 feet high, to eaves 25 feet, and to apex of roof 71 feet; within a partially open timber roof, ceiled across at the collar beams, with organ and choir under a recessed arch behind the pulpit. Without a timber work entrance-way, with a similar *porte cochère* at the side, sustains the rural character of the church, which will be erected at a cost of $50,000.

Of the Catholic churches of St. Paul and St. Francis Xavier, by J. O'Rourke and P. C. Keely, architects, respectively, I have written you. On the 28th inst. the corner-stone of the Gothic building which is being erected at Garden City in memory of A. T. Stewart is to be laid; and on the following day the Astor reredos in Trinity Church will be open to public view, and the new altar consecrated. Of this latter work, too much cannot be said, and as the tiling and coloring are added, and with the addition of the stall furniture, the beauties of the design as a whole are more and more conspicuous; and the thousands who visit old Trinity while doing the sights of New York will now find a piece of designing and modelling worthy of a careful inspection and study. Mr. Withers is preparing an illustrated descriptive pamphlet upon it.

The contest over the Albany State Capitol took a new turn on the 14th inst., when the long-expected meeting of the Capitol Commissioners took place, and it was decided to renew work immediately, and to continue the building in Italian Renaissance, as the style at first proposed, carrying out the exterior in great measure as originally intended by Mr. Fuller, and allowing the new appointees, Messrs. Eidlitz and Richardson, scope to carry out their Romanesque and Gothic intentions in the arrangement and treatment of the interior. The feeling that a compromise of this kind was necessary has been growing among those familiar with the work.

Another incident of the week has been the retirement of Mr. Thomas H. Oakshott, under whose direct superintendence occurred the fatal fall of the Post-Office truss. His retention, in the face of the coroner's jury and other findings, was impossible. His successor is Thomas R. Jackson, an old architect of this city. His works include the New York Academy of Music, Wallack's Theatre, Tammany Hall, etc. He will be remembered as the architect of the Brooklyn Theatre, where, on Dec. 5 last, three hundred lives were sacrificed. Mr. Jackson made himself at that time remarkable for the persistency with which he maintained that that firetrap was a most admirably constructed affair. He is, however, somewhat of an iron man, having now a great iron storehouse in hand on Union Square, and may prove better in managing the details of iron construction than Mr. Oakshott has shown himself.

About nine o'clock on Saturday evening, a party-wall between two tenements on Twenty-third Street settled on its foundations,

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carrying down the floors of both buildings, and endangering the lives of thirty poor families. About half an hour before, the cracking of walls and the snapping of wood-work gave warning; and the police took charge, driving out the residents, in some cases with forcible persuasion. This had hardly been accomplished when the entire party-wall, about thirty-five feet high, and running back about forty feet, came down some seven feet. The trouble originated at the cellar wall, which at the erection of the buildings, twenty-seven years ago, had been most shabbily constructed. It was really nothing more than two "Quaker" faces, filled in with rubbish. How it could have supported the superstructure so long, is more remarkable than its present break. No lives were lost, and the Building Department officers at once took charge, and will condemn the row of buildings of which the wrecked pair were a part.

RICHMOND COUNTY COURT-HOUSE, VIRGINIA.

TO THE EDITORS OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Gentlemen, — Having been called on recently to examine, report upon, and eventually to remodel, a court-house of colonial times at Warsaw, Richmond County, Virginia, I think it may not be without interest to you and to the profession at large, for me to put together in readable shape some items about its history and structure, especially as the plan is somewhat peculiar; besides which it does not appear to me to be exactly right to alter such buildings without preserving in some suitable way — such as in your journal — a description of them as they now stand and have stood for a great number of years. Especially does it not seem right regardlessly to destroy them or heedlessly to add to them, when we recollect that many important events have occurred within them in our country's history, and that men of note, whose deeds have left enduring marks behind them, have spent the majority of their working hours in them. Therefore, before their ancient shape and appearance are so changed by the progressive wants of those who now use them as to leave but a vestige remaining, it becomes our duty to those who have preceded us, to give the world some record of them, that they may not be clean forgotten.

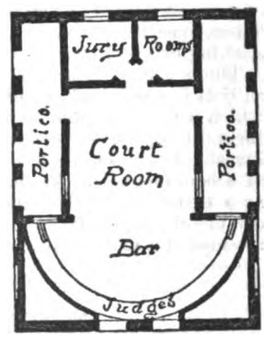
The part of Virginia in which this court-house is situated was about the first colonized. In the spring of 1607, a band of 105 organized settlers, under the control of one Wingfield, landed on the James, at Jamestown, and established an abiding-place. The oldest records preserved in Essex County Court House go back as far as this date. The year afterwards, having passed in the mean time through much trial and tribulation, famine, sickness, and Indian forays, and the said Wingfield having attempted flight to the West Indies with embezzled funds, the colony placed itself under the care of the great traveller, Capt. John Smith, renowned by his adventure with Pocahontas. Under his administration it became more prosperous, and spread very rapidly over the whole of the eastern part of Virginia. Soon after this, in the early part of the seventeenth century, two court-houses were built, and the then county of Rappahannock rejoiced in one on the north side and one on the south side of the Rappahannock River. The spot where the one on the north side stood is now completely forgotten; and among the few records remaining, is one of the year 1749, in the present court-house at Warsaw, directing the sheriff to sell it; probably the bricks and materials were bought by some one, and the whole building torn down. The court-house on the south side was built at a place called "Hobbs's Hole," now Tappahannock, in Essex County, but has lately been entirely destroyed to make way for a larger building. In the year 1692, fourth William and Mary, the part of Rappahannock County on the north side of the river was, by act of assembly, made a district county, and named Richmond; all the old records, of whatever sort, were at the same time transferred to the court-house on the southern side, though but very few can now be found. The records of the north side court-house, or the court-house of Richmond County, are perfect since the year 1692: among them are several directing repairs on the old court-house. In the year 1748, according to all accounts, the court-house I am describing was built. An order relating to it runs thus: —

"At a Court held for Richmond County the sixth day of March, 1748.

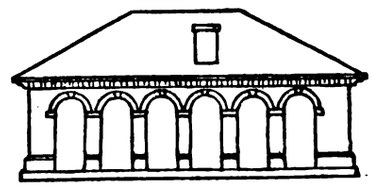
"An agreement between the Court and Loudon Carter. Esqr was this day confirmed for the building of a new Court House according to the plan lodged, instead of repairing the old one for wch said Building when completely and well done the said Carter is to be paid three hundred Pounds so much of wch sum is to be paid him this ensuing summer as the thirty thousand pd^{s} of Tob^{o} already levied for that purpose will Raise."

The plan is such as I here present. The measurements outside are, length 52½ feet; width 41½ feet. On each side are open porticoes 32½ feet long by 8 feet wide, raised from the ground some 8 inches, and having brick floors. They are at present much neglected and very dirty, being used on rainy court days for stabling horses. The outside walls are all of good hard brick, the sizes of the bricks being 2¼″ x 4″ x 8½″, — larger than any now made in the region, — and the spaces between centres of joints being about 3¼ inches. The joints are some of them much cut out by time and weather, and the corners are all in a state of dilapidation. A very curious wooden step at the 4½-feet-wide double door on each side separates you from the court-room beyond, the floor of which is on a level with that of porticoes.

The whole arrangement of the court-room is very peculiar, and such as is shown on plan. The public space in front of the return in which is contained the usual court-house furniture is 20 feet by 21 feet. The judges' seats, with a rail in front, are raised 2½ feet above the floor, and extend all around the segment. I believe the arrangement now is that the judge sits directly between the two windows, and the jury are placed along the sides. The windows are all about 4 feet wide by 7 feet high, and contain 15 panes of glass. The room is 13½ feet high.



The elevation of side with its arches is here drawn. The front — that is, the part facing on the public thoroughfare — is perfectly plain with square-headed windows. The pilasters supporting the arches are all 18 inches thick by 27 inches wide. The two front-most arches are bricked up, as shown on plan, and are plastered on the outside. The springing line of arches is 10 feet from floor; and the arches themselves are 5 feet wide, having stone keys and small stones at springing line.



The cornice is a regular modillion one, somewhat less than 2 feet high. The roof, although constructed so badly that it has now a very concave appearance from the outside, is still quite curious. Eight-inch x 8-inch pieces run along the inside walls, and one runs also along the middle, having the ceiling-joists tenoned into them. These joists are 4″ x 8″ over porticoes and 4″ x 4″ over court-room. The roof is 10¾ feet high in the centre. There are two park-trusses, having 5″ x 5″ king-posts over the 8″ x 8″ piece; 3″ x 4½″ struts supporting 6″ x 5″ purlins, one on each side, on which rest 3″ x 3½″ jack-rafters and shingles. Some decayed struts have their places supplied by rough branches of trees. All the timbers are of white oak.

The whole country around Warsaw is replete with objects of interest to the archæologist. Within a few miles is the old family mansion of the Tayloes, which I did not have time to view, but of which I heard fabulous reports, — such as the entire façade being of marble, and all the interior wood-work of solid mahogany. And not very many miles off, in Lancaster County, is the famous old Christ Church, spoken of in Bishop Meade's "Old Churches and Families in Virginia." The names all about also recall the old days of England: Northumberland, Westmoreland, Essex, etc., were no doubt called after earls of the same name.

I hope to have opportunity at some future day to put before you a description of other old buildings in the region of this court-house. Meantime, I remain, gentlemen, yours, etc.,

T. BUCKLER GHEQUIERE.

BALTIMORE, MD., June, 1877.

BOOK NOTICE.

ELEMENTARY GEOMETRY.[1]

The author states that two principal motives induced the preparation of this work. The first was the desire to reduce what is supposed to be self-evident to the smallest possible amount, and thus to make the science more strictly logical. The second was to treat the theory of parallels in a way open to the least objection. There are other peculiarities in this treatise, among the most prominent of which are the postponement of definitions until the thing to be defined has been shown to be possible, and the substitution of the equality of fractions for the theory of proportions. For instance, the author objects to the ordinary definition of a plane as "a surface such that, if any two of its points be joined by a straight line, that line will lie wholly in the surface," because such a surface might be an impossibility. For this he substitutes the following: "If a line A B be turned round a line B A B, to which it is perpendicular, without changing the perpendicularity, the surface produced is called a *plane*. The line which turns is called the *forming-line* of the plane; the line round which it turns is called the *axis* of the plane; the point where they meet is called its *centre*." In most works upon geometry, more especially in descriptive geometry, lines are generated by the motion of points, and surfaces by the motion of lines; and the first objection raised by the student is, that a point having no magnitude cannot generate any thing by its motion, and a line without breadth cannot

[1] Elements of Geometry. By G. M. Searle, C. S. P. John Wiley & Sons, publishers, 15 Astor Place.

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generate a surface. Our author adopts in general the word "position;" defines a point as "an indivisible position," and a line as "a position composed of all those through which a point, in moving, passes." Yet in the very next sentence he speaks of the point as *producing* the line; in the definition of surface he uses the words, "the line which forms a surface;" and in the definition of a plane quoted above, he says the surface *produced* is a plane. These inaccuracies might be avoided by using the word *trace*, and sticking closely to the idea of position or *locus*.

There is a good deal in the treatment and development of the subject in this treatise which is different from any of the methods which we see adopted in the usual text-books, and which shows ingenuity of development and careful study of the work of modern investigators, whose writings are commonly ignored by the writers of school manuals. We hardly think the book will find its place as a text-book for beginners; while, on the other hand, it may commend itself to those already conversant with the subject, as an attempt at a more logical presentation than is usual.

NOTES AND CLIPPINGS.

THE ILLINOIS STATE HOUSE. — A commission of five of the most prominent architects of Illinois has been appointed to examine the condition of the new Capitol at Springfield to ascertain whether the reports of its unsafe condition are well founded.

THE HARTFORD POST OFFICE. — The new Hartford Post Office was begun in 1873, and all that was done the first year was to lay the foundation. A commission of fifteen per cent was granted to the quarry-owners for all labor in dressing the stone, and consequently a large amount of unnecessary work has been done which has swelled the commissions to an enormous sum. The building is to be of moderate size and three stories high, with a French roof. Of these only two stories are up, and it is said that they have already cost $445,000, and it will probably take $250,000 more to finish the work. The building of the Hartford Fire Insurance Company near by, which is larger than the post-office and made of better material, cost but $175,000.

CONFEDERATE MONUMENT AT ROME, GA. — The design for a monument which is to be erected at Rome, Ga., in memory of the Confederate dead, was made by Mr. A. C. Bruce of Knoxville, Tenn. It is in the Gothic style, and consists of a die seven feet long and twelve feet high, supported at either end by small detached columns. The tablets on the two sides for the memorial inscriptions finish against the die, with two larger columns supporting gablets, with the word "Valor" in raised letters, and the monogram "L. M. A.," above which is a wreath encircling the abbreviated figures "'61-'65" with crossed swords. The monument will be erected at a cost of twenty-five hundred dollars. The design is to be crowned by a bronze statue of a private soldier.

AN AMERICAN'S GIFT TO WESTMINSTER ABBEY. — Mr. G. W. Childs, of the Philadelphia *Ledger*, has had erected in the new poets' corner in the Abbey a memorial window to Herbert and Cowper. This corner, the south-western, was once the abbot's private chapel, then the baptistery, and is now the lay clerk's vestry. The statue of Wordsworth was erected there twenty years ago. Dean Stanley resolved to make it a second poets' corner, chiefly for sacred poets; and it now contains a bust of Keble and monuments to Maurice and Kingsley. Mr. Childs's window pictures George Herbert and William Cowper, "representing," as Dean Stanley says, "two opposite poles of the English Church, — George Herbert the 'ecclesiastical,' and William Cowper the 'evangelical' tendency." Cowper, in his well-known cap and gown, stands in his garden with children standing near him and his hares at his feet. He holds his mother's miniature in his hand, and beneath are the lines from "Mother's Picture:" —

> "Oh that those lips had language! Life has passed
> With me but roughly since I heard thee last.
> Voice only fails, else how distinct they say,
> 'Grieve not, my child, chase all thy fears away.'"

Herbert, in his ministerial robes, stands, surrounded by boys, on the porch of his church. Above, the heraldic devices of the two families, both of importance, are represented.

THE ENGLISH CHANNEL TUNNEL. — The *Economist* says that the engineers who made the geological explorations and soundings for the construction of the submarine tunnel between France and England have reported that the enterprise is perfectly practicable, as there is a continuous bed of chalk between the two shores.

LIABILITY OF EMPLOYERS FOR ACCIDENTS. — Mr. Justice Brett was examined before the select committee of the House of Commons on May 15, 1877, and gave an exposition of his views as to the state of the law upon the matter in the following terms: Injury to workmen arises generally either from the intrinsic danger of the employment, or the work to be done, or from some defect of machinery or plant, or from want of skill or negligence of another workman, or from the negligence of the workman himself. In the first case, where injury has arisen from the intrinsic nature of the employment, there is no remedy by law; where it arises from defects in the machinery, the master is not liable unless he was aware of the defect and the servant was not. In the case of want of skill, or negligence, whether by the workman himself or his fellow-workmen, there is no liability on the part of the master. Mr. Justice Brett submitted his opinion that the exception of the master's liability in respect of accidents arising through the negligence of one workman to another was founded upon a wrong application of the principle of implied contract.

A FOSSIL ICHTHYOSAURUS. — Lately a block of Derbyshire marble was sawn into slabs at the Pelican Marble Works, Derby. Upon removing them from under the saw it was found that a fossil ichthyosaurus had been cut through. The head was quite perfect, but it was a little shorn of its tail.

EGLISE DU SACRÉ CŒUR. — Of the seventy-nine holes, measuring about one hundred and twenty feet in depth, that must be dug in order to receive the masonry piers which are to support the new national church of the *Sacré Cœur* at Paris, fifty-four are nearly finished. From these pits have been excavated more than 88,000 cubic feet of material. As soon as this excavation is finished and the piers are built, work will begin upon the immense retaining-wall, eighteen or twenty feet in height, which is to surround the building.

THE LATE ARCHBISHOP OF PARIS. — On the 30th of the last month, the anniversary of his murder, was dedicated at Paris the statue of Monseigneur Darboy, archbishop of Paris, the third of the archbishops of Paris who have lost their lives while seeking to quell a revolution in its incipient stages. The statue, which is the work of M. Bonassieux, represents the archbishop leaning against the wall of the prison where he was killed, at the moment when he received the fire of the Communists.

THE POROSITY OF GLASS. — Professor Quincke, of Heidelberg, has made many experiments to determine whether gases can penetrate the pores of glass. A pressure of one hundred and twenty atmospheres has been found incapable of forcing a perceptible quantity of carbonic acid or hydrogen gas through a glass wall one and one-half millimètres thick, during a period of seventeen years. No loss of weight was perceptible.

THE VICISSITUDES OF ST. SOPHIA. — Twice the temple of St. Sophia was destroyed by fire, and twice rebuilt; twice the great dome fell, and twice it was restored. At the capture of Constantinople it was desecrated by the slaughter of those who had sought sanctuary there. The sultans have despoiled it of its pictorial beauty; have added minarets and abutments to support the tottering south-east wall; have caused the rich frescoes to be plastered over with a yellowish substance; have chipped away wherever it was possible, the carved symbol of the cross; have hung great disks graven with the names of the four companions of the Prophet over the seraphims under the dome, with their slender wings crossed above and below them; and beneath the cupola have inscribed in fantastic and beautiful characters a line from the Koran: "God is the light of the heavens and of the earth."

LEONARDO DA VINCI'S "LAST SUPPER." — M. Viollet-le-Duc writes from Milan to the *Journal des Débats:* "I have been distressed at my visit to Sante Maria delle Grazie to see the fresco of Leonardo da Vinci, of 'The Last Supper,' completely disfigured by restorations. The three apostles at the end of the table, to the right of Christ, have been entirely repainted. And then this fine painting is in its last stage of decay. The wall is incurably damp, and the plaster flakes off in small pieces, which gradually become larger. It is many years since I saw the Cenacolo, but from what remains, it appears to me that Morghens's engraving is singularly wanting in the greatness, action, and expression of the original."

AN ANCIENT CALENDAR. — In digging near Ceri, Rome, there has been discovered a superb marble fragment of an ancient Roman calendar, containing the second half of the first five months of the year. Beside the usual indications of days, feasts, and the different games, there is a list of the principal solemnities. Some of these last are quite new; others confirm conjectures which have been made by learned men on less certain indications. The most recent date which can be read is that of the dedication of the Altar of Peace by Augustus, in the 745th year of Rome.

THE LAND OF MIDIAN. — A correspondent of the *Times*, writing from Alexandria, informs the public that Capt. Burton, the African traveller, has made a "find" of unusual interest. At the request of the Khedive, he has visited the "land of Midian," the desolate region on the eastern side of the Gulf of Akabah, the easternmost of the two long and narrow estuaries in which the Red Sea ends.

Accompanied by M. George Marie, a French engineer, Capt. Burton landed in Midian on 2d April; and in an exploration of some weeks, explored a region full of ruined towns built of solid masonry, with made roads, aqueducts five miles long, artificial lakes, and massive fortresses, all marking a wealthy and powerful people. Their wealth was based on mining operations; and Capt. Burton reports the existence of gold, silver, tin, antimony, and turquoise mines. The auriferous region is extensive; indeed, the discoverer believes he has opened up a California; and the Khedive proposes to have the country worked by European capitalists.

It will be remembered that in the Bible Midian is always described as a land full of metals, especially gold, silver, and lead. It is more than probable that Solomon's Ophir was situated there, as the small ships in which he imported gold, ivory, and peacocks, were launched at the head of the Red Sea. Midian is part of the Egyptian viceroyalty.

THE DANGER OF DRAINING INTO THE SEA. — Mr. Crookes, F.R.S., at a recent meeting of the Institution of Civil Engineers of England said that "were the whole of the sewage to be discharged into the sea, the supply of fixed nitrogen could not stand the drain very long. If, then, the community continued to waste the supply of available nitrogen, the time might come when there would be neither bread nor beef — and not even gunpowder." On the other hand, Mr. Bazalgette at the same meeting spoke of the sea "as affording the most economical and efficient means of dealing with sewage."

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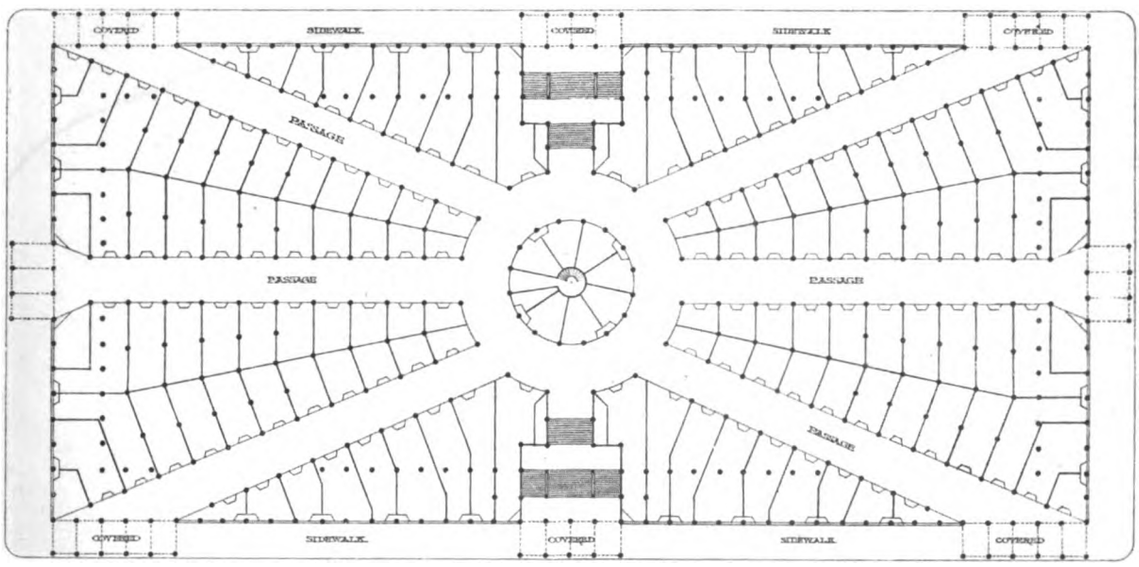
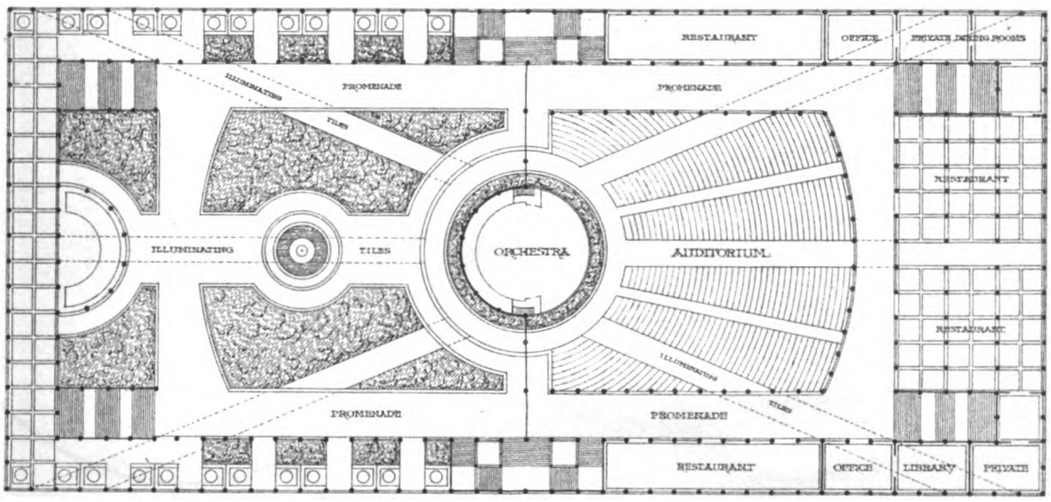
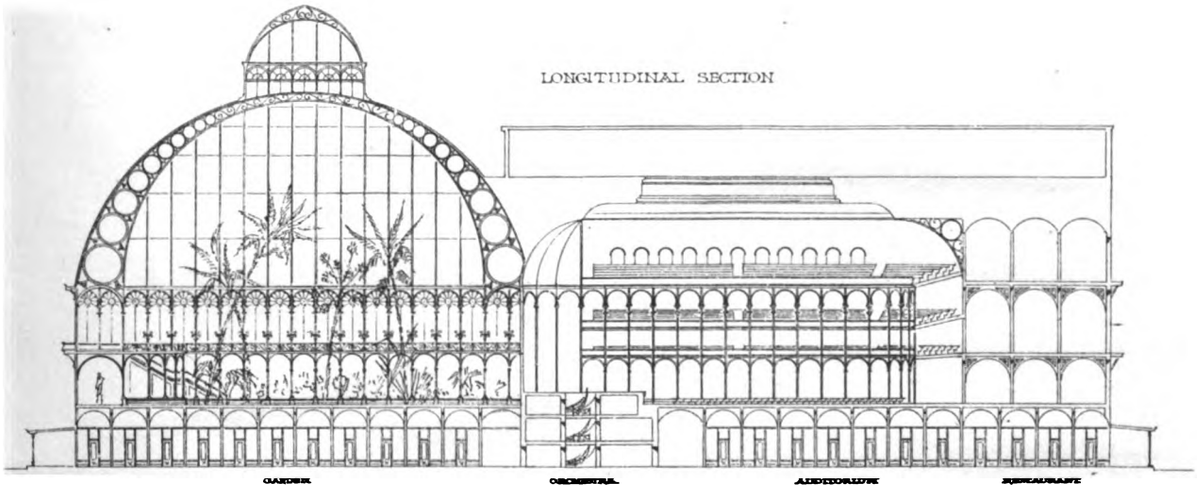
PLAN OF ARCADES AND SHOPS.



PLAN OF AUDITORIUM AND GARDEN



LONGITUDINAL SECTION



PROPOSED THOMAS CONCERT GARDEN AND HALL.

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—HOUSE FOR D. N. SKILLINGS, WINCHESTER, MASS.—

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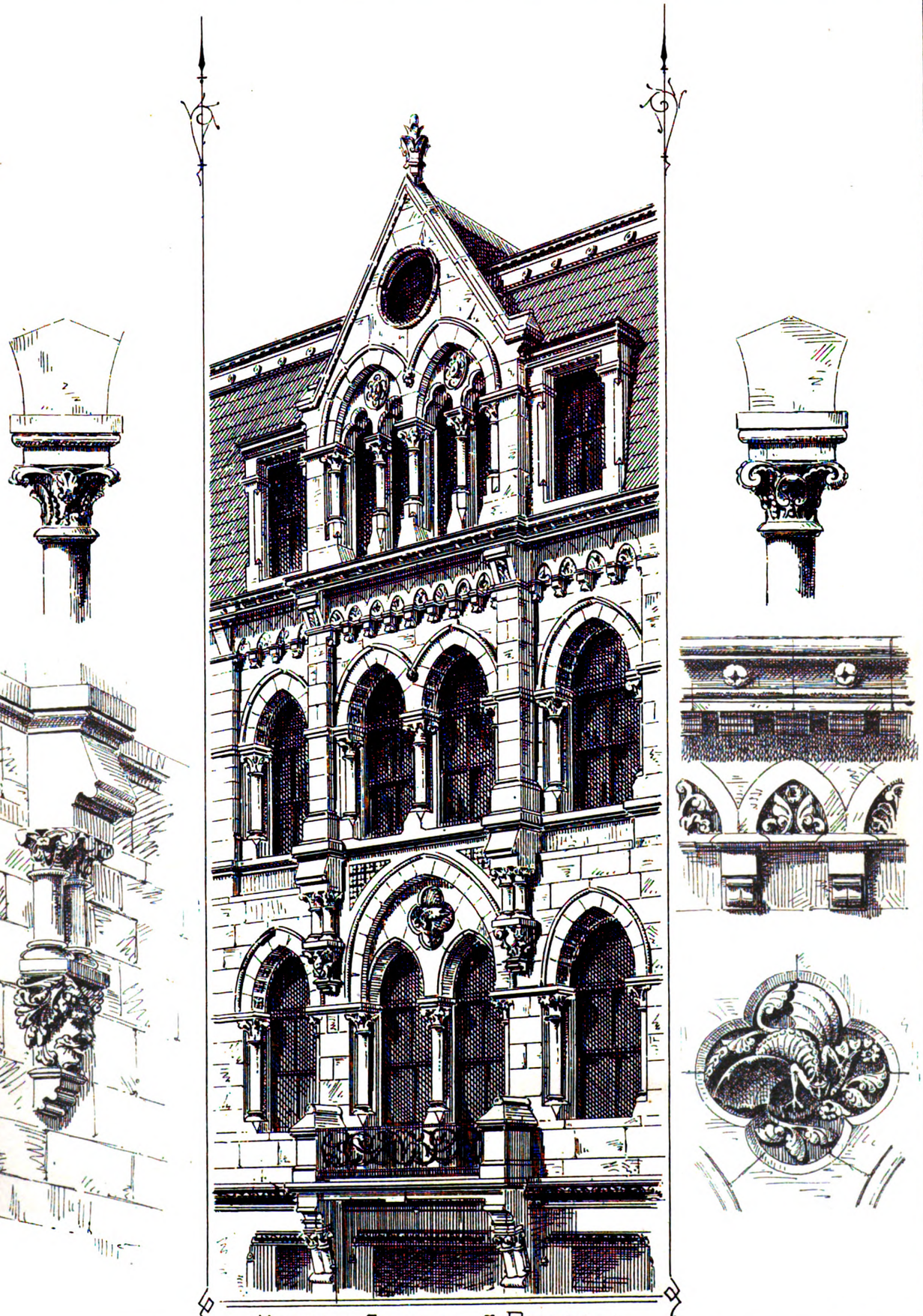
PART OF HUNNEWELL BUILDING, CORNER OF WASHINGTON ST. & ESSEX ST.



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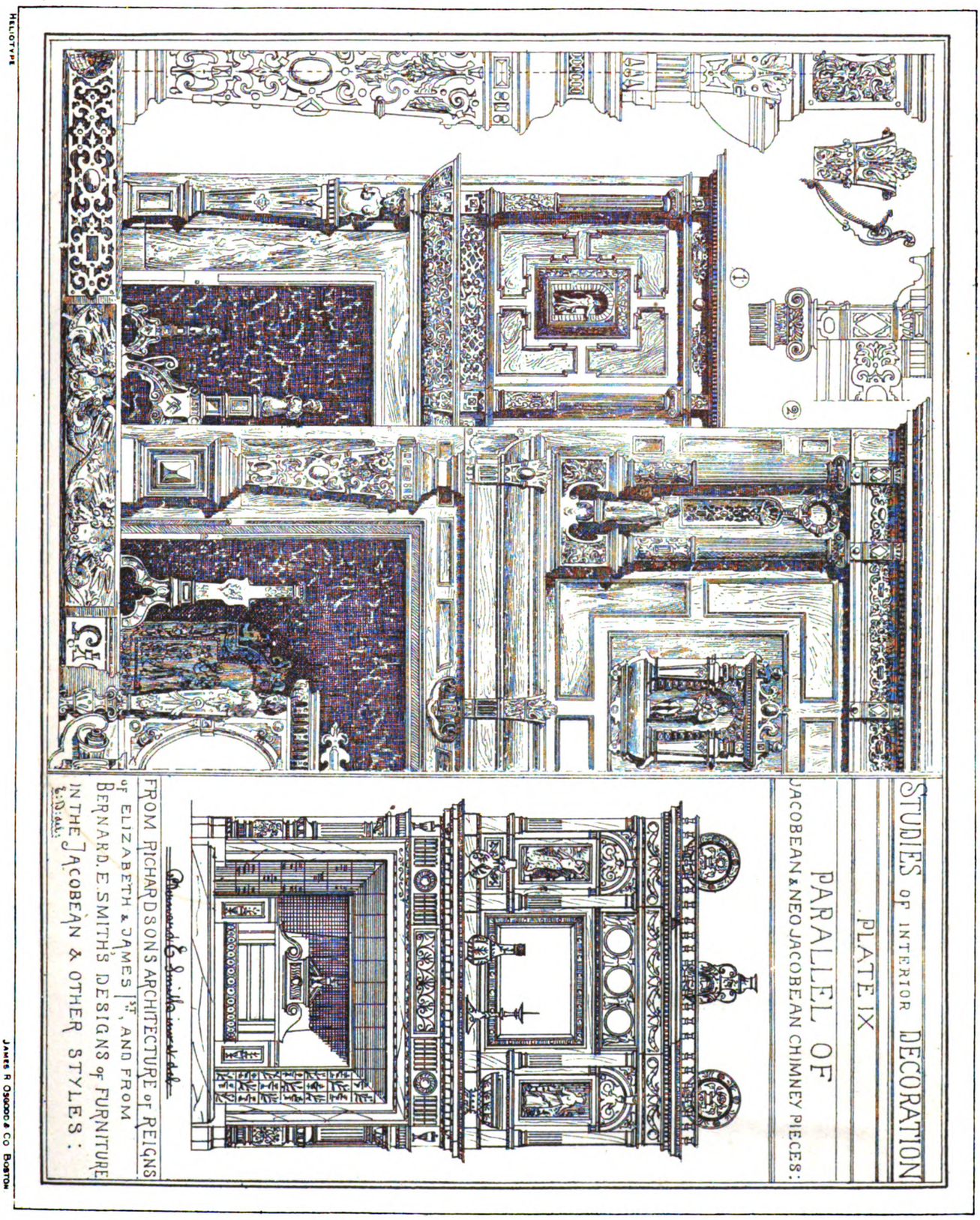

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, JUNE 30, 1877.

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IF any more warnings against fires were needed, the burning of St. John ought to furnish them. Two-thirds of the town is gone, it is said, including most of the dwelling-houses and pretty much all the business quarter. Such fires naturally and reasonably give us a greater shock than does a record of an equal amount of loss distributed over a long period, for they represent a much greater injury than the mere sum of the losses which they include. The suffering from them is greatly intensified by the extent of it. The merchant who loses his house loses also his warehouse and goods. The bank in which his deposits were, the insurance company whose policies he held, the manufacturing company in whose stock his earnings were invested, the neighbors with whom he transacted his business, all have suffered, perhaps failed, under the blow. The opportunities to which he would look to make up ordinary losses have vanished with his property. The family that has lost its home has lost also its means of subsistence. The very food and clothing of the whole town are consumed in the shops as well as in the houses, and the gas-light dies out from the streets: plunder and violence follow, and the terrors of war are let loose upon the people. Such blows have a paralyzing effect upon communities, even when a vigorous reaction follows them at first, as it did in Boston, Chicago, and Portland. No insurance covers the losses; in a business aspect there is absolutely no offset and no compensation for them. Yet they are not to be passed over as exceptional phenomena, for which no provision is to be made in our every-day plans. We have seen four of these fires in the last eleven years. There is not a town in the United States, big enough to furnish food for one, that is not liable to one at any time. As towns grow bigger and more crowded, the danger of them increases, and the means of resisting them do not keep pace with it. All the while we know perfectly well — at least those of us who have taken the trouble to find out know, and any one may know — that in other countries ways of building have been devised and are in constant use, which prevent such fires ever occurring. We know that the mob which had unchecked control of Paris in 1870 tried hard for two or three days to burn it, and could only burn single buildings here and there. We know that the expense of such ways of building is found to be a less burden to a community than the losses they guard against; and that they are adopted by nations far less wealthy and powerful, and as we fancy less enterprising, than ourselves. The only obstacles in the way of our adopting them are the common apathy and ignorance, and the unwillingness of individuals to submit to restrictions which are necessary for the public welfare.

WHILE we were writing the last paragraph another fire was added to those that have laid waste our towns. A great part of the famous old town of Marblehead, in Massachusetts, was burned on the 25th of June. Most of the business houses and manufactories of the town were consumed, and hundreds of the inhabitants burned out of their homes. Marblehead is one of the few towns in the older part of New England which retained the quaintness and picturesque irregularity of an older time. The loss of its peculiar features would be from a sentimental point of view a great loss to those who value such characteristics. Sooner or later this kind of destruction comes upon all towns built as ours are. Where the means of the people are small, and they feel compelled to build of wood, and to build close, it is probably useless to expect that so long as wood continues abundant, they will avoid the dangers of it. It may be inevitable that conflagrations should beset the small years of towns here, as croup and measles do those of children. But at least this is no rule for the larger and wealthier cities. And even in the smaller towns, at least those of slower growth, where buildings are handed down from father to son, and where many buildings are put up that are meant to be good enough to last, it is a fair question how far it would be found remunerative to build, as is done in the small towns of the older world, with solider materials. It may, to be sure, be useless nowadays to ask any American town to make preparation for a slow growth.

THE coroner's verdict on the destruction of the tenement house in Shawmut Avenue, Boston, in the burning of which one man was killed and several injured because of the difficulty of escaping, finds that the building "was provided with only one narrow staircase-entrance to the tenements above, and was without a fire-escape as required by law; that the fire originated in or near this only entrance, and so quickly filled the entire building with fire and smoke as to cut off all exit to the street or roof." It appears also that the proprietor of the building took out a permit for one kind of building, and built another; and that the building-inspector's report upon it, rendered under another inspector than the present, did not accord with the structure. The jury recommend a more stringent building-law: "so that every building hereafter erected, or to be occupied above the first or ground floor as a tenement-house, hotel, manufactory, schoolhouse, or place of public assembly, should have more than one staircase enclosed in and constructed of non-combustible materials, and of such width as shall be approved by the inspector of buildings." This is the first decided official recommendation we have noticed of what every considerate person knows ought to be done. It belongs to architects and builders, who naturally more than any others influence the building-laws of our cities, to use their best exertions to bring about this moderate measure of reform; and as architects have taken the initiative before, here is another opportunity for them. After all, the retrospect is encouraging. It is hardly a dozen years since we first made any attempt at efficient building-laws; and in that time public conception of what such laws should be has made a great advance. There is good reason to hope that before a great while we shall learn wisdom, and not continue in this department of civilization to lag behind the rest of the world.

THE accounts given of the tenement house that fell in New York a week or so ago show that the party-wall which first sunk down had been laid on a bed of marsh clay without a footing-course, the foundation wall having two facings of stone and a filling of loose rubble, brickbats, and rubbish, without even bond-stones to connect the two faces. The warning element in the case is the suddenness of it. The wall which gave way had shown no sign of weakness, beyond an ordinary cracking of plastering and sagging of adjacent doors. It gives one more proof that it does not do to build slightly in the expectation that signs of yielding will give notice when it is time to give up a building, or that what would not do for a permanent building is strong enough for one that the proprietor only means to use for a few years. Proprietors change and intentions change; and so long as a building seems to hold its own and brings any profit, there is every temptation to let it stand till its site is needed for something else. The dread which suggests itself now is lest

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people, finding that a foundation wall built like this in New York has stood a score of years in such a situation, should be tempted to try such a thing again. It is reported that another tenement house in the same city gives such promise of falling that the occupants have been warned out by the police, but that the dread of losing their month's rent has so much more terror for them than the fear of being crushed, that they will not leave unless the police drive them out. It is not strange that people will risk building tumble-down houses if they can find other people so willing to risk being killed by them.

THERE has been first and last a good deal of controversy concerning the advantage to the Government of the percentage contracts for stone-work on the public buildings, that were made in the Supervising Architect's office a few years ago, during the incumbency of Mr. Mullett. Several very large contracts were let out to stone-cutters on the same terms; for instance, the work on the New York and Boston Post Offices, and on the new building in Washington for the State, War, and Navy Departments. The terms of the contracts were a fixed tariff per cubic foot for the stone furnished, the cutting to be done by day's work, and fifteen per cent on the cost thereof allowed to the contractor as a "margin," for the rent of his yard, shops, and plant, for the using up and sharpening of his tools, and other incidental expenses, and for his profit. These contracts had certain advantages, being a sort of guaranty of solvency in the contractors, and having an elasticity which, coming as they did on a falling market, made them possibly as profitable to the Government as a contract for a fixed amount would have been. They certainly avoided the difficulties which are the bugbears of government contracts, of straw bids, and of contracts deliberately taken at unremunerative rates, to be eked out by bills of relief and log-rolling in Congress; and they were sureties for a good quality of work. On the other hand, they gave temptations to the contractors to make the cost of the work excessive, and to evasion; they obliged the Government to have time-keepers constantly on the watch at the works, and to be dependent on their watchfulness and good faith. It was argued, too, that fifteen per cent was an unreasonably large commission to allow the contractors. It was no more than a contractor would expect to get in estimating for a small piece of work; but in the enormous contracts given out by the Government, it doubtless included an excessive remuneration. Under these circumstances, the Secretary of War, backed by an opinion of the Attorney-General that the Government had a right to abrogate the old contracts, has withdrawn those which were pending with the Richmond Granite Quarries and the Bidwell Granite Company for stone for the north wing of the State, War, and Navy Department building. That this could be done without destroying the profit of the contractors, is apparent from the report of Col. Casey of the United States Engineers, which says that new contracts have been negotiated with the same parties, by which there will be a saving of about $440,000 in one contract, and $233,000 in the other; or in the whole, some $673,000. There will be naturally under the new arrangement, a tendency to lower the standard of work rendered, which will have to be met by vigilance in inspection.

THE liability of the city of Philadelphia for payment of the warrants issued to Messrs. Struthers' Sons by the commissioners on account of their contract on the new City Buildings has been affirmed by the court. As we understand the opinion of the court, it is that the municipal government of the city is only the agent of the legislature; and that the legislature having delegated its power for a special purpose to the building commission appointed by it, the contracts made by that commission in pursuance of that purpose are as binding on the municipal government as if that government itself had made them. This was in the suit of which we spoke last week, commenced because the representatives of the city, dissatisfied with the way in which the Messrs. Struthers had performed their contract, refused to honor the warrants drawn by the commissioners for the work which they, the commissioners, had accepted. The immediate question, it will be seen, was not concerning the quality of the work, that having been duly accepted by the commissioners, authorized thereto by the legislature, but whether the city authorities, disagreeing to the action of the commission, should escape liability for it. The decision was what might have been expected; and it is to be hoped, that if it should be appealed from, no technicality will upset it. It is very undesirable that governments, municipal or state, should be allowed to suffer wrong; but it is a great deal worse if they are allowed to do wrong.

THE 19th of the coming August will be celebrated in Antwerp as the three hundredth anniversary of the birth of Rubens, though it has not been, we believe, the day commonly accepted as his birthday. In addition to various festivities in honor of the day, the Burgomaster and Council of Antwerp have issued an invitation for a general "Art Congress," the management of which is intrusted to the Royal Artistic, Literary, and Scientific Society of the city. One of the principal topics which it is proposed to lay before the congress is the international recognition of rights in artistic and literary productions. As long ago as 1858 the question was proposed in a congress at Brussels; and in one at Antwerp in 1861, where eight European governments were represented, the subject was very fully discussed, and conclusions accepted which it was hoped might lead to some uniform legislation for the protection of artists in regard to the reproduction and imitation of their works. No legislation of any importance followed, however; and the congress of this year is invited to renew discussion of the subject, in the hope of securing more practical results. The occasion of the congress naturally suggests also the discussion of the life and influence of Rubens; and the decline of what is spoken of as monumental painting is one of the subjects to which special attention is called. The wide range covered by the title of the association to which the planning of the congress is committed makes it seem not unnatural that a wide range of subjects should be offered; one wonders nevertheless how any one congress is to do justice to all the questions that are presented. The questions to be discussed are as follows: —

I. Legislative section. Researches to be made for the basis of an international legislation on which to found the protection of copyright, and the repression of fraud and of imitation of works of art. Questions: What are the proper legal means of securing to the artist the copyright of his works? What practical measures could be adopted to facilitate the proof of counterfeit and fraud? What legal guaranties can be given to musical composers to secure to them their just share in the proceeds of their works? How can the resolutions of the congress be enforced and their application made general?

II. Artistic and philosophic section. What is the importance of Rubens in art, and what has been his influence on our own and foreign schools? What influence has democracy on art?

III. Artistic and economic section. How can greater impulse be given to monumental painting? and can it be brought back to that degree of importance to which it formerly attained, especially in our country? Should public authorities interfere for the encouragement of art? Is centralization useful or injurious in matters of art? Is it not to be desired, in behalf of art and artists, that all the artistic riches of the various establishments which belong to public authorities should be accessible?

IV. Architectural section. Ought each country to repeat in its building the traditions of national architecture? Is it not desirable in our country to revert to the types from the thirteenth to the seventeenth centuries for public monuments and buildings, adapting these types to modern uses? Would it not be well that the civic authorities should have a right to control the architectural style of buildings, especially those which are near monumental structures, so that they might be made to harmonize with them?

V. Historical section. What elements have we for a history of the works of Rubens?

IF the experts, assisted by Mr. F. D. Lee of St. Louis, architect, Mr. Nelson of Evansville, builder, and Maj. Smith, U. S. Engineer Corps, appointed by the Indiana State House Commission, fail to approve one of the four plans selected at the last competition, another competition for the Capitol will be announced in the principal cities of the country.

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THE SHAPING OF TOWNS. — II.

ONE of the most serious inconveniences that men are subjected to in our large cities is the necessity of travelling long distances, and spending a great deal of time between their homes and their work. For the New Yorker, for instance, whether he takes a ferry-boat to Brooklyn or Staten Island, or a horse-car to an up-town house, or a steam-train to a suburb up the river, an hour each way is the least time he must allow for his daily transit. New York is the worst of our cities in this respect, and there the waste of time and annoyance thus caused have long been a matter of great complaint, and its remedy of eager discussion; but others of our towns are not greatly better off. To wealthy men whose business does not press them very hard, and who are willing to pay for the charms of a suburban life, the burden is not so great; but to the greater part, who must be at their business pretty early, and make a long day, it is a heavy one. The endeavors that are made to meet the difficulty are all in the direction of quickening the transit, a thing for which thus far no satisfactory means have been found. For cities which are already in this trouble, there is apparently no other relief; but for those which have their growth before them, it is important to consider whether there may not offer some natural ways of avoiding it.

In some cities, of which Paris may be taken as the type, the difficulty is avoided by superposing residence and business premises over pretty much the whole territory, so that there is always a home to be had in or near any quarter to which one's occupation may lead him. It has been the English and American habit, however, to keep the commercial and the residence quarters of a town distinct. In many busy towns this is in some degree a necessity of their sites, but it is also the result of a strong sentiment, so strong in fact that wherever in an American city business gets a foothold upon a street or square, the better class of residents, those who hold to the English tradition of a house to themselves, flee before it as from a pestilence, leaving between it and them a neutral zone of boarding-houses. For people of this temper it is an essential condition in the arrangement of their towns that the residences and the commercial quarters shall be distinct. When there is no natural barrier the tendency of business is to spread itself out thin, and cover a good deal of ground in every direction, so driving habitations far on all sides from the centres of business. We are in the habit of tacitly assuming that any thing which checks or confines this tendency in any direction must necessarily be an injury. Yet it may happen that a barrier which offers some check to the spread of a business quarter in one direction, if it does not fence it to inconvenient crowding, will on the whole be an advantage to a town both by compacting its business into close compass, and by resisting its tendency to drive dwellings into the distance.

One means of combining at once proximity and ease of communication with distinct separation between places of business and dwellings, and a means which is in many respects the most convenient of all, is a difference of level. It is the means, in fact, which secures insulation between house and business with the minimum of distance. This insulation is got artificially in Paris, and in other cities of like arrangement, by reserving the one or two lower stories of the buildings over the greater part of the city for shops and offices, and the upper stories for dwellings which have no connection with the business premises below, so that such cities are stratified, as it were, in commercial and domestic layers. This arrangement is very serviceable, perhaps the most serviceable on the whole, in large towns which have no marked difference of level in their natural situations. It is, however, not in accordance with any habits yet formed in American or English communities; and in a great many towns there are natural differences of level that may be availed of to secure the kind of insulation which Englishmen and Americans prefer, that is, an actual separation of quarters as well as premises, with almost as great proximity as the other system gives. A tolerably abrupt elevation, for instance, of some fifty or sixty feet, or even less, may prove as effectual a barrier as a mile or two of level distance; even more effectual, because more permanent, if it is rightly employed. Such an elevation, high enough to lift the houses on it well above the buildings below, may be compared in its convenience to a promontory or cape running out into deep water. It may, of course, be so placed as to be only an impediment and a disadvantage; but where there is room enough for growth and communication, the bluff that constrains its business plain on one side may be in the end as real a convenience to a town as the water-front that confines it in another. The one, however, being an obstacle which challenges removal, the community is apt to attack it as soon as any of its inconveniences are felt, without waiting for a considerate weighing of its advantages and defects. A strip of elevated land a mile long and half a mile wide, bordering upon the commercial region of a city, might, with a proper distribution of inhabitants provide fifteen or twenty thousand people with house-room, where the men of the families could, on an average, walk down to their places of business in ten minutes. Fifty feet of rise would lift this platform above the danger of invasion of trade, while stairs and inclines would make it accessible to foot passengers in a minute or two, and a circuit of only a quarter of a mile would be enough to lift carriages and wagons to double the height.

A great difficulty in the way of this convenience is the unreasoning prejudice against ups and downs. The very man who would think it fortunate to have a house within a mile of his counting-room, and would disregard the hundred feet which his road might rise in that distance, would be very ready to set the pick and shovel at work upon an elevation of a third the height if it lay directly before him, without stopping to think of the mile or two of distance it might save him if he would climb to its top and dwell there. Our forefathers prized such situations and seized them as vantage-grounds; but to us they are intolerable, and exist only to be levelled. All this is at the very time when we are beginning to think nothing of carrying our buildings a hundred or a hundred and twenty feet into the air. The same use of elevators which makes this sort of building worth while will provide an easy way of overcoming differences of level in streets or squares for the weak-kneed or the indolent. It is not altogether a disadvantage that the routes for carriages and traffic have, in such a case, to be separated from those of foot passengers. The circuit of a quarter or a half mile which would be required simply to overcome a height would probably, at first suggestion, appear an intolerable nuisance to a people impatient of circuitous routes; but the same length of road and difference of level between distant points would seem a trifle.

When we leave the points of convenience for business and residence, and turn to salubrity, we find many things in favor of variety of levels in towns. Not only do slopes and elevations give advantage in respect of light, air, and outlook to the houses, but they tell greatly in favor of cleanliness, and of the ventilation and disinfection of streets. We have one large city, Baltimore, in the United States, which prides itself on the surface drainage which its uneven area secures for it, to that degree that it neglects to provide itself with sewerage. Whatever may be thought of this choice, it is clear that if a hilly town can do better than a flat one without subterranean drainage, it has equally the advantage over it, that its sewers will keep cleaner and deliver their contents more freely, and also that the surface of the streets will be more easily cleansed, whether naturally or artificially. Moreover, by providing shafts in the elevated points, the cardinal need of ventilating the sewers can be met to the best advantage. The one public service which is liable to be much impeded by irregularities of level is the water-service, to which elevations are often a difficulty. Nevertheless the introduction of standpipes and high service supplies have overcome this difficulty in all cities where it has been felt to be serious.

We are far from arguing that inequalities of site are necessarily and in all cases a blessing. This would be as unsafe as the converse notion we are combating, that they are necessarily a disadvantage. But we wish to draw attention to the fact that they often have great advantages; and that so far from being looked upon instinctively as enemies, to be got rid of if possible, as we Americans do commonly look upon them, they should be carefully scrutinized for the benefits they may offer, and with the understanding that they may prove to be the best of friends. It is not to be imagined that the inhabitants of Edinburgh or Genoa would find the convenience or comfort of their cities

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enhanced, or that any thing but regret would follow, if the heights that engirdle and diversify them were levelled. Yet if sites of equal promise were now occupied for the first time, it is only too likely that the instinct of the day would lead to their being degraded into something as near flatness as engineering could secure, with sacrifice of their native convenience, as much as of their beauty. We have not spoken of the question of beauty, because this is one on which there can hardly be two minds, and because it is beside our present discussion. But the questions of convenience are questions which do not bring their decision as a matter of course, and in which it seems to us the notions that commonly influence people are not well considered. It is a misfortune that questions of business and residence should be so habitually studied apart as they are. In respect of comfort as well as of beauty, they ought to be regarded as parts of the same problem; and the best total result is not to be obtained by giving either of them undisputed and unmodified predominance. The problems which they bring up are problems which concern all people, but which architects by virtue of the bearings upon them of their professional work have especial reason to consider, as by virtue of their training they have special opportunity to study them. In a matter in which not many people have clear convictions, the few who have them may often exercise a controlling influence; and though democratic communities are not apt to make their towns to order, and it is not easy to compel the direction of general growth when every one is his own master, it may be in the power of architects by vigilance and intelligent advice to save a good deal not only of disfigurement, but of more practical injury, to the towns with which they are concerned.

STUDIES OF INTERIOR DECORATION.

XII.

MEMORIAL HALL, CAMBRIDGE.

ANY one who has done us the honor to read these chapters will have discovered that they do not pretend to point out any cheap or easy way of arriving at successful results in matters of interior decoration, and that they are not devoted to the exposition of any mood of antiquarianism, any whim of passion, or any doctrine of æsthetics. Their aim is to show that the great art which so shapes and combines the gross materials of building that they take upon themselves a new significance, and become informed with the spirit of humanity — the art which out of necessity creates beauty — does not stoop from its high calling when it concerns itself with the minutest completion of its own works; that the line of demarcation between architecture on the one hand and the combination of interior forms and colors on the other, by which architecture is brought closer to the sympathies of mankind, is arbitrary and irrational; and that in both the best effects are attainable only by development through processes of analysis and study.

In illustration of this thesis, we have hitherto confined ourselves to domestic examples; and, as their range of suggestion is inexhaustible, we shall probably have occasion again to refer to these more familiar opportunities of art. But after touching upon such commonplace matters as wall-papers, carpets, furniture, hangings, stuffs, and the painting of ceilings, and indicating how even in these the serious study of design may find abundant and fruitful occupation, it seems useful for us to consider whether in more monumental subjects we shall have occasion to employ similar methods of development, or whether, by reason of their more dignified character and larger scale, they will constrain us to enter other regions of thought.

For this purpose it is evidently more instructive for us to take an actual example in which the limitations and requirements are positive, and not assumed for the sake of a desirable conclusion.

Plate X. is a longitudinal section through the hall which has been erected at Cambridge to commemorate the patriotism of the graduates and students of Harvard University who served in the army and navy of the United States during the war for the preservation of the Union. This hall practically serves as a vestibule to the great dining-hall on the west, and to the Sanders Theatre on the east. The section faces the east, and exhibits a portion of the arcade or screen of black walnut which surrounds the hall, and contains, inscribed upon marble tablets, the names of those who fell in the service of their country. Above this screen rise grouped shafts, from the capitals of which spring the ribs of the vaulting. All this portion of the decoration is in ash.

Hitherto the flat wall surfaces, A, of this room have been treated with a light brown tint, and the great bays between the vaulting shafts have been bordered with a single style, B, which extended down to the screen, and was made up of a line of black against the ash, a band of darker brown than the field above noted, edged with a line of black walnut color, and finishing with a separate narrow black line around the panel or field. This arrangement is shown in the upper part of the drawing. Upon the lower part of these panels appeared inscriptions, mostly out of the Latin classics, appropriate to the place, and set forth in mediæval red letters and large black initials.

Within a short time it has been deemed necessary to place in this hall a general dedicatory inscription. This has assumed the form and position indicated in the central bay of Plate X., which shows a white marble tablet similar in character to those below, but of greater size, set in a heavy black walnut frame, surmounting the arcade, and decorated with mouldings, carvings, and statues, the height of the marble tablet being indicated on the frame by angle shafts.

But notwithstanding the architectural devices by which the new tablet was made to grow out of the original substructure, that it might appear an essential part of the composition, it seemed isolated, like an afterthought. The union was evidently not sufficiently complete. At this juncture, no further structural connection seeming practicable, comes the opportunity for the completion of the architectural idea by color.

To remedy the defect of isolation, it now becomes evident that we must make this feature the leading incident in a new belt of decoration, to be carried above the arcade, and across the lower part of all the wall bays, the suggestions for the detail of this belt being taken from the structure of the frame of the tablet itself.

The angle shafts, which, as we have observed, mark upon the frame the height of the inscribed marble, naturally prescribe the width of the main division C of the new belt, and define in six of the wall bays on either side of the hall, the position and size of certain areas, in which the former wall-inscriptions can be redistributed with greater dignity and effect than when they occupied, or rather wandered unconfined in the original unbroken fields of wall. These areas or panels, which thus obviously have their *raison d'être* in the central marble, leading the eye to it, enhancing its dignity, and conferring upon it a fixed instead of an accidental location, are defined horizontally by subordinate belts, D and E, of color. The width and position of these belts are given by the width of the architectural members of the frame with which they correspond; viz., D, by the base on which the angle shafts are placed, and E by the carved corbel which they support. These members are thus in their turn forced into union with the walls.

On either side of the tablet in the central bay there remain, between the belts D and E, two exceptional spaces, to which, on account of their proximity to the tablet, we must evidently give especial interest, without separating them from the rest of the composition or competing with the marble. A diaper-treatment is naturally proposed, and the character of it suggested by a detail of the original decoration. It has been found expedient not to alter the styles, B, of the great bays, as their function of introducing the ash wood of the vaulting to the wall surfaces has been sufficiently well performed, and as any attempt to modify them would render necessary expensive scaffolding, and undesirable fundamental changes of effects. For the sake of unity, therefore, we accept the suggestion made by these styles, B, and extend their lines through the above-mentioned spaces, so repeating and crossing them as to divide these areas into small rectangular quarries. By this contrivance the mutual relations of the old and new work are made so close and obvious that there can be no question of afterthought. In order to give significance to these quarries, each of them is occupied by a cipher (composed of the initial H and a cross), similar to that used outside as a finial to the western gable.

The same diaper, following the lines of the old styles, is repeated to enclose the new panels C at their ends in every bay. The shape of these panels therefore is not accidental, but generated from existing conditions of the problem.

But if these vertical styles, B, were permitted *to cross* the two belts of color, D and E, which form the upper and lower boundaries of the panels C, the connection between these panels and the central tablet, being thus interrupted, would cease to be sufficiently obvious, and the object of this new study of decoration would be in great part defeated. At the same time it is desirable that there should be an *evident* relation between the upper styles and the diaper work. This is a subordinate condition, but one important to be observed. Above the upper belt E, therefore, a horizontal black line, G, is drawn, against which all the lines of the upper styles are stopped. But to soften the transition between the old and new work, and still further to "marry" the lines of the tablet to the wall, we find it expedient to repeat all the lines of the upper styles *horizontally* at H over the upper belt E, crossing the old lines as shown, all these new lines being drawn from corresponding lines of construction in the tablet, where they profile against the wall behind the flanking pinnacles. The new decorations thus contain no lines arbitrarily placed.

Now that we have our system of wall-painting set forth in black and white, let us give life to it by color. Practically the supreme features of interest and usefulness in this whole design are the white marble tablets and what is thereon inscribed in dark red letters. The sharp whiteness of these marbles would defy all attempts at a composition of harmonious color were they not sunk deep in large masses of heavily moulded black walnut with occasional light friezes, K K, of butternut embellished with painted decorations in black and red; and, as regards the lower range of

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tablets, were they not relieved by inlays of dark red and gray marbles with sculpture under the points of the arches. Although the white tablets still properly assert their pre-eminence and command the first attention, the deep shadows of the frames greatly soften the harsh transition and prepare for the composition of low neutral tones of color by which we must justify and complete the architectural thought.

As the great tablet must still remain the starting point of our study, we must consider how by color we can assist in uniting this feature with the wall against which it is placed. We have already described why the surfaces on either side of the tablet are diapered with quarries the lines of which are suggested by the styles, B. This of course introduces the colors of those styles, viz., a background of brown crossed by broad lines of black-walnut color, the cipher and thin border lines in the resultant quarries being given in a still warmer and darker brown. These tones, which were originally contrived with a view to softening the transition between the ash of the vaulting and the light brown of the walls, serve this purpose even more sufficiently with the black walnut. The same harmony of low tones appears of course at F F, where these diapers occur in the other bays, as well as in the upper belt H, which forms the lower border or style of the great pointed panels.

But we find the wall still needs *enrichment* by color. We have now only light and dark browns, wood colors, and black; these make a very sober harmony, which however needs to be relieved somewhere with a touch of border color, and the splendor or glory of a stronger contrast. Now in the staircase bays, L L, which are shown on either side of Plate X., we have already a wall treatment of brown red, in order to distinguish the areas devoted to an object of utility from those consecrated to the memorial. To give the necessary enrichment and preciousness to the latter, we are therefore naturally invited to introduce somewhat of this new element of color. If we use this red in the belts D and E, and treat the panels C between them with clear buff as a background for the red letters of the wall inscriptions, the latter will at once become important features of decoration, and have their proper relation with the inscription carved in the marble; both are compositions of dark letters on a light ground, but the painted effect is softer, less decisive, more of a decoration in short, and less insistant to be read. The merely decorative inscriptions moreover are quotations in Latin, while the commemorative inscription is in English.

We have thus an outline or map of color treatment, viz., panels, C, of buff with red Roman letters, — borders D and E, at top and bottom, of red, — borders F, on the sides, of neutral browns diapered. In order to enforce and define the important red belts D and E, we feel that we must edge them with strong black lines, and, to enliven their characteristic color, carry through them, parallel with the black, two shadow lines of red. To soften the contrast between the buff and the borders we enclose the buff panels in lines of black and red. As a last touch, in order to break up the monotony of the many parallel lines of various values which we have accumulated, we distinguish one of the black lines by breaking it into dentils or blocks.

We have thus, we hope, intensified the solemnity of the place, and added to it a new interest of color and surface decoration. We have made the side-walls of the hall more compatible with the splendors of the stained glass which fills the ends, and the wall inscriptions have become an essential part of the design. But in view of the immediate object of this writing, it is more important to observe that a purely architectural problem has in this manner been solved by the brush alone, all the details of its work, whether of line or color, having been developed from essential conditions as directly and as severely as if we had been dealing with a study of architectural forms and masses.

THE ILLUSTRATIONS.

DETAILS FROM MEMORIAL HALL OF HARVARD UNIVERSITY, CAMBRIDGE, MASS. MESSRS. WARE AND VAN BRUNT, ARCHITECTS.

(2 Pemberton Square, Boston, Mass.)

THIS plate presents the interior elevation of the west end of the great dining-hall, which, above the wooden screen work, is lined with ornamental face brick and tiles; also a portion of the vestibule hall, showing entrance to dining-hall, the gallery over the entrance, and the arrangement of the memorial tablets; also the stone finial of the west gable, and the details of the copper gargoyles of the tower.

This drawing, as well as the drawing of the Hunnewell Building, which was published in our last number, is one of the series prepared for publication by the Portfolio Club, of which we have already printed several, and of which we expect to publish the rest at intervals.

ST. FINBARR'S CATHEDRAL, CORK. VIEW OF CHANCEL FROM NORTH TRANSEPT, SHOWING BISHOP'S THRONE, STALL, SEDILIA, ETC. MR. W. BURGES, ARCHITECT.

The completion of this cathedral is now rapidly advancing, a contract having been made to build the three towers and spires; in fact, the two western spires are well advanced. The external carving has also been undertaken. In the interior great progress has been made, and the carving is now completed. The first two stages of the bishop's throne are in hand, and the whole will probably be finished as a memorial to the present bishop of Cork. The plan of the throne is a square, upon which is placed canopy-work in the form of an irregular octagon, under which two carved angels will support a shield. Above will be a second stage of canopy-work and the carved figure of St. Finbarr. The whole will be enriched with carving and diaper-work. The material will be oak stained to a rich color, and emphasized here and there by a little gilding.

The illustration of the bishop's throne and the accompanying description are taken from the *Architect*.

FIREPLACE IN THE DINING-ROOM, OSSEO LODGE, W. VA. MR. CARL PFEIFFER, ARCHITECT.

(113 Broadway, New York, N.Y.)

THE WALLS OF THE WINNEBAGO COUNTY COURT-HOUSE, ROCKFORD, ILL. MR. H. L. GAY, ARCHITECT.

(90 La Salle Street, Chicago, Ill.)

STUDY OF INTERIOR DECORATION. — PLATE X.

See the article above. Rec'd p. 224 July 14, 1877

LIGHT: ITS SANATORY INFLUENCE AND IMPORTANCE IN BUILDINGS.

[Read before the State Charities Aid Association, May 25, 1877, by Mr. Carl Pfeiffer.]

MR. PRESIDENT, LADIES AND GENTLEMEN, — Architecture is perhaps the most many-sided of the arts, and stands in the most intimate relationship, not only to all its fellow arts, but also to all its fellow sciences, for architecture is as much a science as an art. It has all the elements of sculpture, only that it does not have for its object the representation of the human body, but merely the habiliments, so to speak, or the outward clothing of that body.

While thus related to the arts, borrowing beauty from all of them, architecture turns to science for wisdom, without which, indeed, beauty were of little avail, even if it could at all exist. Mathematics, physics, mechanics, and engineering in nearly all its phases, have to be studied by the architect. The importance of the connection between hygiene and architecture cannot be overestimated, especially when we remember that so far as statistics reach back more than one-third of the human race die before reaching the age of five years, whilst according to M. Flourens, the great French investigator on this subject, the average duration of life should be one hundred years, and that this terrible mortality, while it reveals the inefficiency of the drug-store, no less clearly points out the neglect of architecture in its hygienic character. Architecture is just beginning to show that by making each dwelling-house a real sanitarium, disease will be not so much cured as prevented, — prevented at least, as far as possible, for the architect's hygienic power extends only to the dwelling. He recognizes as one of the chief problems of our times the urgent necessity of providing healthy homes for the people.

To accomplish this hygienic task he calls into service the two great agents of the world's whole being, the sources of all life on earth, and symbols of the eternal life beyond, — heat and light. He studies these wonderful phenomena in all the various appearances which they put on, and tries to discover the best mode of introducing them into and properly distributing them in the artificial habitations he has erected for man, and thus takes man from the cold and sickliness of his primitive huts to the warmth and health of a well ventilated and heated dwelling.

Concerning heat and its relation to the distribution of a properly tempered, pure atmosphere throughout our dwellings, in other words, concerning the subject of ventilation, I have already spoken on a previous occasion. I will therefore eliminate it as much as possible from the present, and speak here only of light, and chiefly of light in its hygienic relation to architecture.

I do not propose to enter the pitfall of unprofitable speculation, but shall consider merely the natural light in so far as it relates to architecture and hygiene. And here I may as well touch at once the main point of the relation of architecture to the science of light, by humbly acknowledging that of all men who have contributed to the development of our art, there is no one who deserves more our gratitude than the glass-maker, who first enabled the builders of dwelling-houses to furnish mankind with light, warm, and cheerful homes, in place of dark, cold, and dismal huts, or chilly palaces. The window is the second eye of man, without which the dwelling-house would be simply a kennel or a cave. Many new and wondrous things have been discovered in regard to this same glass, even within these past few years. A Frenchman has made it malleable. Gen. Pleasanton, by painting every eighth pane of his conservatory, has made it so fructifying to plants and animals that if his statements prove true, and his "discovery" generally applicable, this whole earth of ours will soon be overrun with living organisms; and poor Malthus, who thought even our present increase of population dangerously

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large, will turn in his grave with vexation and despair. Nay, has not Mr. Shove proposed to make use of this wonderful material for effecting what none of the numberless schools of medicine have as yet been able to effect, — the utter banishment of disease from this planet of ours? — with sanitaria such as he sketches for us, with glass houses of so vast an extent that each covers forty acres of ground, filled with the most varied kinds of plants, flowers, vines, and trees, laid out on the plan of the most luxurious parks, and high enough for the erection within the grounds of hotels, schools, libraries, etc., wherein ten thousand people may every winter season enjoy the delights of a perpetual spring and summer climate, undisturbed by changes of weather and the like nuisances of out-door existence; wherein no "probabilities" are tolerated, the thermometer being established as the only trustworthy weather-cock.

However, every thing has its limits of utility, even glass, in its relation to health; and it is the architect's special business to investigate those limits. Not all glass, in its function of transmitting light, is of equal value: it may be too thin or too thick, or the material of which it is made may have been mixed with injurious substances, or badly solidified. It may be placed in the wrong position, and become a constant source of irritation, or there may be too much of it, etc. I desire to call particular attention to these injurious qualities which light may exercise in passing through glass, as it is a subject hitherto almost entirely neglected.

Have you not often noticed the peculiar heating and oppressive effect made upon you by sunlight that has passed through the thick French plate glass now so general in use? It is a feeling very much akin to that experienced on a sultry, sunny, *electric* summer day, before the storm has gathered. You do not feel it when you open the window and stand in the free sunlight, nor is it perceptible through every kind of glass. But this thick plate glass invariably produces it, especially when the rays of the sun fall upon it in an oblique direction, and in the winter time. It would seem evident that the heat rays and the magnetic rays which light produces in its transit through our atmosphere gain the preponderance over the pure light rays by passing through the glass, and, destroying the equilibrium, injure our health. A window, again, with a number of small panes, especially if the panes are of uneven and coarse glass, makes you giddy by the unevenness of the rays that cross each other from pane to pane; and the same objection would apply to a house built with glass alone, such as Mr. Shove dreams of. A similar effect is produced, indeed, by reflected light of every kind. Hence the necessity of regulating the color of the walls in a room with regard to the number and position of the windows, of avoiding placing mirrors in such a position that the light falls upon them, etc. All reflected light has an injurious effect; not upon the body only, but also upon the mind. I cannot understand, therefore, why Sir David Brewster, who otherwise is so judicious in his remarks on this subject, should suggest: —

"The opposite sides of the street or lane should be kept white-washed with lime; and for the same reason the ceilings and walls of the apartments should be as white as possible, and all the furniture of the lightest colors."

For the whitewashed houses on the opposite side of the street must necessarily cast their reflected light through the windows on the other side, and the extremely white ceilings and walls there would only make matters worse. This remark, of course, applies only to streets that admit sunshine; for in dark streets or rooms such whiteness may be not only allowable but absolutely needful and healthful. I intended simply to point out the necessity of avoiding extremes, and to call your attention to the care which the architect must take in regulating the light as well as the heat of his building. That dark streets, alleys, cellars, rooms, etc., may stand greatly in need of light-beams, is thus very neatly exemplified by Dr. Brewster: —

"In all great towns, where neither houses nor palaces can be insulated, there are in almost every edifice dark and gloomy crypts thirsting for light; and in the city of London there are places of business where the light of day never enters, and where the precious light which the sky sends down between chimney-tops is allowed to fall useless on the ground. On visiting a friend whose duty confined him to his desk during the official part of the day, we found him with bleared eyes struggling against the feeble light which the opposite wall threw into his window. We counselled him to extend a blind of fine white muslin on the outside of his window, and flush with the wall. The experiment was soon made. The light of the sky above was caught by the fibres of the linen, and thrown straight upon his writing-table, as if it had been reflected from an equal surface of ground-glass. We may mention another case equally illustrative of our process. A party visiting the mausoleum of a Scottish nobleman wished to see the gilded receptacles of the dead which occupied its interior. There was only one small window through which the light entered, but it did not fall upon the objects to be examined; upon stretching a muslin handkerchief from its four corners, it threw such a quantity of light into the crypt as to display fully its contents."

This reflected light thrown into a dark room from a white handkerchief or a white screen is not hurtful, simply because it is, in point of fact, not reflected, but direct light; or, in other words, the source of the light in the dark room: it is just as if a lamp or candle were lit in the room. But that the *reflected* light from the white walls of a room which is itself lit up by direct light has a disagreeable effect, every one can easily test for himself. I quote, however, from Miss Nightingale's "Notes on Nursing": —

"Who has not observed the purifying effects of light, and *especially of direct sunlight*, upon the air of a room? Here is an observation within everybody's experience. Go into a room where the shutters are always shut (in a sick-room or a bed-room there should never be shutters shut), and though the room be uninhabited, though the air has never been polluted by the breathing of human beings, you will observe a close, musty smell of corrupt air, — of air, i.e., unpurified by the effect of the sun's rays. The mustiness of dark rooms and corners, indeed, is proverbial. The cheerfulness of a room, the usefulness of light in treating disease, is all-important.

"Heavy, thick, dark window or bed curtains should, however, hardly ever be used for any kind of sick in this country. A light, white curtain at the head of the bed is, in general, all that is necessary, and a green blind to the window, to be drawn down only when necessary.

"'Where there is sun there is thought.' All physiology goes to confirm this. Where is the shady side of deep valleys, there is cretinism. Where are cellars and the unsunned sides of narrow streets, there is the degeneracy and weakliness of the human race, mind and body equally degenerating. Put the pale, withering plant and human being into the sun; and, if not too far gone, each will recover health and spirit.

"*It is a curious thing to observe how almost all patients lie with their faces turned to the light*, exactly as plants always make their way towards the light. A patient will even complain that it gives him pain 'lying on that side.' — 'Then why *do* you lie on that side?' He does not know; but we do. It is because it is the side towards the window.

"A fashionable physician has recently published in a government report, that he always turns his patients' faces from the light. Yes, but nature is stronger than fashionable physicians; and, depend upon it, she turns the face back, and towards such light as she can get. Walk through the wards of a hospital, remember the bedsides of private patients you have seen, and count how many sick you ever saw lying *with their faces towards the wall*."

And why do they not turn their faces towards the wall? Because if it does give light, that light is reflected, and hurts them, even when it has to pass through their eyelids; and if it does *not* give light, they turn from it to hunt up light. The all-overpowering delight of the patient, and indeed every health-desiring human being, however, and the sweetest treat for the eye itself, is to be able to look through the direct light of God's atmosphere into the blueness of the sky, that most wonderful mixture of darkness and light, — that dark background of the infinite, lit up with the clearness of light to the very shade suited to human eyes. I cannot forbear to illustrate further the importance to architects of obtaining this direct communication with light and the sky in all the rooms of their buildings, than by quoting again from Miss Nightingale: —

"Second only to fresh air, however, I should be inclined to rank light in importance for the sick. Direct sunlight, not only daylight, is necessary for speedy recovery, except perhaps in certain ophthalmic and a small number of other cases. Instances could be given, almost endless, where in dark wards, or in wards with a northern aspect, even when thoroughly warmed, or in wards with borrowed light even when thoroughly ventilated, the sick could not by any means be made speedily to recover.

"Among kindred effects of light, I may mention from experience, as quite perceptible in promoting recovery, the being able to see out of a window, instead of looking against a dead wall; the bright colors of flowers; the being able to read in bed by the light of a window close to the bed-head. It is generally said that the effect is upon the *mind*. Perhaps so; but it is no less so upon the *body* on that account.

"All hospital buildings in this English climate should be erected so that as great a surface as possible should receive direct sunlight, — a rule which has been observed in several of our best hospitals, but, I am sorry to say, passed over in some of those most recently constructed. Window-blinds can always moderate the light of a light ward; but the gloom of a dark ward is irremediable.

"The axis of a ward should be as nearly as possible north and south; the windows on both sides, so that the sun shall shine in (from the time he rises till the time he sets) at one side or the other.

"There should be a window to at least every two beds, as is the case now in our best hospitals.

"Some foreign hospitals, in countries where the light is far more intense than in England, give one window to every bed. The window-space should be one-third of the wall-space. The windows should reach from two or three feet of the floor to one foot of the ceiling. The escape of heat may be diminished by plate or double glass. But while we can generate warmth, we cannot generate daylight or the purifying and curative effect of the sun's rays."

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What Miss Nightingale here says about the employment of plate and double glass is quite correct, so far as the production of more heat is concerned; which, however, is not caused because the thickness of the glass prevents the escape of heat from the room, — as may be shown by letting fresh air into the room from other openings, — but because that kind of glass passes more of the heating, and especially of the actinic, or magnetic, or electric rays of light into the room, or generates those qualities of magnetism, etc., in passing it. For, as M. Emile Saigney, the eminent French writer, clearly puts it, "all forms of light exhibit three kinds of rays, — those which are purely luminous, those which are also calorific or heating, and those which are chemical or magnetic. And I may here add a fact, which will explain the difference in the light transmitted through different kinds of glasses. The purely luminous rays of light we of course never see, precisely because they are light, and we can only see color; but we feel them, and see by means of them. Now of the other rays of the spectrum, or of the colored light, it is generally known, that the yellow, orange, and red rays are specially heating, while the blue, indigo, and violet rays are especially magnetic; but it is not so generally known that the maximum of heat is found in the dark region beyond the red, and that those which are refracted upon the other side, beyond the violet, have a special aptitude for exciting chemical action.

I do not propose to enter into an examination here as to why the so-called dark or invisible rays of light, in its appearance to us, should possess these different qualities in a pre-eminent degree: I merely propose to suggest that every different kind of glass may change the relation between the luminous, calorific, and chemical rays, even as the prism — to which all glass is more or less alike — changes it.

Thus, if a solar ray be received upon a prism of water, the maximum of heat will appear in the yellow, upon a prism of common glass in the red, upon a prism of flint glass beyond the red, upon one of rock salt far beyond the red in the entirely dark portion.

Now it may very well be, nay, unquestionably is a fact, that in the case of some (invalid) persons a superabundance of electric rays may be beneficial for health, and excite a feeling of pleasure; and this is the fact upon which Gen. Pleasanton has built his "blue light" theory.

I think the overwhelming majority of facts — not to speak of the natural supposition that if we needed more indigo in our light it would be there — confirms Miss Nightingale's statement of the vast superiority of pure sunlight coming direct from the blue sky and changed as little as possible by the windows through which it passes. If shading is needed, shutters or curtains can be made to act as the eyelashes of the window, and like them keep away a superfluity of light; and if properly constructed so as to allow a change of colors, all the benefits peculiar to the divers kinds of light-rays can likewise be obtained. Those who are suffering from any form of mental irritation or nervousness, for instance, can place themselves under the influence of neutral tints, blue, violet, etc., while the dull, indolent, and depressed may derive benefit from the stimulating colors of red and scarlet. Miss Nightingale seems to think that "shutters should never be shut in a sick-room or bed-room;" but this, I fancy, is only an exaggerated statement, or perhaps made with special reference to the dark atmosphere of England. Extremes are always to be avoided. There may be days or hours when there is too much light in a room, and too much light is also dangerous; it is not only apt to produce partial or total blindness, hemeralopia, violent disarrangement of the nervous system, etc., but even insanity and death. The tyrant Dionysius, who was aware of the terrible torture produced by an intense degree of light, especially when reflected, inflicted on some of his unhappy prisoners the dreadful punishment of compelling them to pass rapidly from great darkness to the full blaze of the sun in *recently white-washed rooms*. Let us therefore, by all means, furnish our buildings with abundant provisions for the entrance of light: but at the same time let us not neglect to provide for its control whenever it is likely to become excessive, — by means of the shutter; and for its purification, as it were, whenever the composition of its rays is not in harmony with the eye, — by colors.

Let us deal with light just as we do with heat, — supply enough of it, but never in excess, and purify it by ventilating-apparatus in every room of the house.

There is one class of buildings to which this applies particularly, — our schoolhouses. No other buildings stand so much in need of pure air and sufficient warmth, or ventilation, and of an abundance of pure light properly arranged with a view to its fall on the pupils' eyes.

For not only are the eyes of the children exceptionally tender, but being compelled to pass the most of their school time in a more or less bent position, however scientifically the school furniture may be arranged, and to strain their eyes by looking upon the white paper in most of their studies, these children require that special attention be paid to the arrangements made for the introduction of light into their rooms and its proper shading, when from the changed position of the sun or other causes this becomes necessary.

Their play-grounds, on the other hand, cannot be too open to the solar light; a rule of hygiene that many of our public schools sadly overlook, and which public and private institutions deliberately and constantly violate, by erecting high walls around the grounds of their institutions, as if the sun were the deadly enemy of mankind instead of its best friend. The effects of such a dark, enclosed playground on school-children, and the contrary effects of full exposure to sunshine, are thus happily described in an old number of the *Pall Mall Gazette*, by Dr. Winter. He says: —

"Passing round St. Paul's churchyard the other day, our ear caught a low confused sound which seemed to issue from behind a grille under the gloomy portico of St. Paul's school. Attracted by so unusual a sound, and blinded for a moment by passing from the sunlight under the portico, we at length made out that the sound was that of boys' voices in play. After a little time, when our eyes had been accustomed to the darkness, we perceived that some score of boys were actually at play within its unhappy shade. Such a profound sanatory error on the part of the authorities of the school, to shut up their youth in a cage without light or air, and there bid them play, struck us with some astonishment. Boys at their games are like young birds singing on the bough; half their joy is the result of the influence of the sunny air. We are told, indeed, that only a very short time is spent in this gloomy retreat: but surely it is hard that the hour of recreation, when academic art should give way to nature, should be selected for this depressing process as at present carried on. What would Dean Colet have said to it?

"When the St. Martin's national school, leading out of Endell Street, was built some years ago, we noticed with pleasure that a playground was built *at the top of the school*, where light and air were plentiful, conditions essential in a playground where the children use violent exercise; but this example, we are sorry to see, has no effect upon the Mercers Company. The necessity of light for young children is not half appreciated. Many of the afflictions of children, and nearly all the cadaverous looks of those brought up in great cities, are ascribable to this deficiency of light and air. When we see the glass rooms of the photographers in every street high up on the topmost story, we grudge them their application to a mere personal vanity. Why should not our nurseries be constructed in the same manner? If mothers knew the value of light to the skin in childhood, especially to children of a scrofulous tendency, we should have plenty of these glass-house nurseries, where children may run about in a proper temperature, free of much of that clothing which at present seals up the skin — that supplementary lung — to sunlight and oxygen. Glass-house nurseries lifted up to the topmost story would save many a weakly child that now perishes for the want of those necessaries of infant life."

Great benefit to the health would accrue by giving children what the ancients termed *solaria*, or "solar-air baths;" that is, permitting them to lie naked upon the bed or floor, free from the incumbrance of swaddling clothes, so that their bodies may be thoroughly brought under the influence, for some period of the day, of good air and bright sunlight.

Playgrounds and gardens arranged on the top of such buildings as schools, hospitals, and even of private dwellings, etc., are, indeed, beginning to grow quite in favor, and in a large city — where ground is often the dearest part of those public buildings — can scarcely be dispensed with. "Some years ago," says Dr. Winslow, "when visiting the great Hospital of St. John at Brussels, I was much impressed with the most judicious hygienic arrangements made in the construction of that building for the health and comfort of the invalids. On the roof of the hospital an elegant garden is laid out with great taste, and planted with shrubs, small trees, and a grass lawn, interspersed with pretty and sweet-smelling flowers. It is, in fact, a *Parc de Monceaux* in miniature. In this quiet rural retreat, patients, particularly the convalescents, are permitted at certain hours of the day to promenade, indulging in the luxury of good air and bright sunlight."

Still more objectionable, however, than these enclosures of playgrounds put up for the special purpose of excluding sunlight, are those human habitations into which under any circumstances sunlight finds it impossible to penetrate; for while those playgrounds have at least access to the open air, being unroofed, the latter habitations have no access to pure air at all, but are on the contrary constantly filled with the foulest atmosphere. I allude, of course, to the cellar dwellings which in our large cities abound so plentifully and pitifully, and especially to those which are the dwellings of the worst classes of our population. All the murderers that may inhabit them are not a hundredth part as destructive of human life as these their dismal dens themselves. On a former occasion I have pointed out their destructiveness of life, with reference to the want of ventilation and pure air, and to the constant entrance, which they permit, of the poisonous gases that penetrate from the sewers and gas-pipes of the street into them.

But now I wish to add that even the most bountiful provisions for the exclusion of those poisonous gases, and for the admission of pure air, could not atone for the want of light. Truly does Sir David Brewster say: —

"If the light of day contributes to the development of the human form, and lends its aid to art and nature in the cure of disease, it becomes a personal and national duty to construct our dwelling-houses, schools, workshops, factories, churches, villages, towns, and cities, upon such principles and in such styles of architecture as will allow the life-giving element to have the fullest and the freest entrance, and to chase from every crypt, cell, and corner

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the elements of uncleanness and corruption which have a vested interest in darkness."

But as houses are built now it is next to impossible to bring light into these underground rooms of our cities, even by adopting such artificial means as the white screens of which we have spoken before; and it is absolutely impossible to fill them with direct sunlight.

"Rightly recognizing the life-giving and health-sustaining influence of this light," says Dr. Winslow in his work on *Light and its Influence on Life and Health*, "the 'Towns Improvement Clauses Act of Scotland' enacted that no cellar less than seven feet high, without a window, and of which more than two-thirds are below the level of street, should be inhabited. Acting upon the authority of this statute, the corporation of the city of Edinburgh has considerably improved the physical condition of the working classes of that town by peremptorily closing 3,000 dreary, sunless dens, in which the poor people were in the habit of residing." The same authority adds, "It was computed not many years ago, that in Liverpool between 30,000 and 40,000 people lived in cellars. As a consequence of this state of things, the health of the working classes became seriously affected. Legislative measures were adopted for the purpose of declaring such habitations illegal, and those living in them were ejected by the strong arm of the law. In 1849, 4,700 cellars were cleared of 20,000 inhabitants."

I may add that in Germany also numerous efforts have been made of late to prohibit the inhabitancy of cellars altogether. But no city in the world, I believe, is so cursed with dens as the city of New York; even as it ranks pre-eminent amongst cities for the barbarous character of its tenement-houses, of which I now propose to say a little. In a recent sermon Dr. Tyng stated, that in the more crowded districts of New York there are 200,000 to the square mile, or 120,000 more than are packed in the same space in any part of London. More than seventy-five per cent of the mortality in these tenement-houses, he added, was of children.

It may be well here to bear in mind the words of Charles Dickens, who wrote: "Of all the coffins that are made in London, more than one in three is for a little child." Is not this a state of things so frightful as to require the most stringent interference of the law? But all the attempts hitherto made by our Board of Health to control the construction of buildings with a view to prevent at any rate the main cause of this wholesale assassination of our population, have been opposed, owing chiefly to the insuperable objection of our people to the least interference with individual freedom. It is argued, that if a man has the necessary money to pay for it, he is at perfect liberty to put up any kind of a house, tenement or otherwise, though he have it so constructed as to make every room in it a Calcutta Black Hole; and that those who rent the rooms of him have only themselves to thank for the consequences.

I say he has no such right. He infringes not only upon the right of his tenants, but, in our case, of every citizen of New York, since he assists in the spreading of all kinds of disease and crime. He is in point of fact no less a murderer than is the direct poisoner, for he erects laboratories that of themselves produce poison; and were it but for our own sake, it is time that an end should be put to this horrible occupation.

You will undoubtedly concede that in what I have said on the importance of constructing all human habitations in such a manner that each part thereof may be accessible to a sufficiency of light, and if possible of direct sunlight, I have not allowed myself to become one-sided in my plea. I have admitted, what is indeed self-evident to any observer, that we may have too much light, or special occasions may call for the shading of light or for giving predominance to special colors, and that hence the architect must also provide for these contingencies. Indeed, every climate requires that its architecture should conform in its arrangement of windows, etc., to the quantity and quality of the light which that climate possesses, as well as to its temperature. The aim of the architect in this direction must be, as I have said, so to arrange his buildings that they will supply a sufficiency of light and heat, and yet keep both light and heat under perfect control.

Let us, then, by avoiding extremes, not only pursue the right path, but also pave the way for it amongst the public. Nothing is more difficult than to introduce a change in a man's modes of thought and living when that change is advocated by extremists. It has been established by careful observation, that where sunlight enters all the rooms of a dwelling, the inmates are less liable to sickness than in a house where the apartments lose its health-invigorating influences.

I fear that this fact is not sufficiently borne in mind in the construction of the so-called apartment houses. Many are being built with bed-rooms into which direct sunlight never enters; they receive "borrowed" light only from shafts called "well-holes." Such arrangements ought to be prohibited by law. Such apartment houses will, no doubt, increase the mortality among children, and contribute to the degeneracy of those who grow up within their walls.

Sir James Wylie, late physician to the Emperor of Russia, attentively studied the effects of light as a curative agent in the hospitals of St. Petersburg; and he discovered that the number of patients who were cured in rooms properly lighted was four times greater than of those confined in dark rooms.

In all cities visited by the cholera, it was universally found that the greatest number of deaths took place in narrow streets and on the sides of those having a northern exposure, whence the salutary beams of the sun were excluded.

The Romans seem to have had a greater appreciation of the sanatory effects of sunlight than we have in this country at the present day; they had a building-act in the time of Augustus, restricting the height of street fronts. It seems to me that such a law ought to be enacted for this city. They exist in the large cities of Europe; there the height of buildings is regulated by the width of the streets, and no one is permitted to deprive his neighbor of a sufficiency of sunlight. I wish I could enlist the interest of the gentlemen of the press to advocate a reform in these matters in this city. Buildings of such inordinate height as are on the north-east corner of Spruce Street and Nassau Street, on the south-east corner of Fulton Street and Broadway, on the north-west corner of Fifth Avenue and Forty-second Street, and many others of similar height, ought not to be permitted.

Florence Nightingale observes: "A dark house is always unhealthy, always an ill-aired house. Want of light stops growth, and promotes scrofula, rickets, etc., among the children. People lose their health in a dark house, and if they get ill they cannot get well again in it."

Dr. Edwardes of Paris says the action of light tends to develop the different parts of the body in that just proportion which characterizes the species; and that, in warm climates, the exposure of the whole surface of the body to the action of the light will be very favorable to the regular conformation of the body. Humboldt confirms this in the account of his voyage to the equinoctial regions: he says, "Both men and women (whose bodies are constantly inured to the effect of light) are very muscular, and possess fleshy and rounded forms. It is needless to add that I have not seen among these people a single case of natural deformity."

In truth, the light and heat and chemical influence of the sun's rays may be considered as the physical cause of all vital power. The inestimable value of light as an element in the preservation of health, and treatment of disease, should be fully appreciated in the construction of all streets and buildings, particularly those intended as habitations for the poor, or public hospitals for the treatment of disease.

At the present day it is entirely too soon to take extreme ground on any phase of the light subject. It is a subject which, in its practical phases, is but just undergoing experiment and observation. If I have in any way contributed to direct more special attention to its relation *to health in dwellings*, and therefore to architecture in general, I shall feel quite satisfied with my efforts.

In conclusion, permit me to add yet a few words of an eminent physician: "Let the sun come into our dwellings, and let our chambers be on the sunny side of the house. A room that the sun is not permitted to look into at all should be without a door; it is unfit for human occupancy. Even the flowers will grow pale and be frightened to death in it. The primary object of a window is not for the sons of men to look out, but for the sun to look in.

"Pleasant sunshine not only brightens a man's buttons, but his heart; it makes his spirit as cheerful as the landscape: he cannot be happy without it."

CORRESPONDENCE.

THE STEWART MEMORIAL CHURCH.

NEW YORK.

THE Stewart Memorial Church at Garden City, L.I., the corner-stone of which was laid on the 28th inst., has been the centre of no small amount of speculation, because of the meaningless air of mystery which has been thrown about the whole enterprise. At first it was intended to have it merely a memorial chapel on a small but elaborate scale. As the work went on the ideas of the donors enlarged, and now it is intended that the building shall be finished as a cathedral, under the name of the Cathedral of the Incarnation for the diocese of Long Island P. E. Church.

The church is cruciform in plan, having a tower with a spire over the main entrance. The plan shows nave, aisles, transepts, choir, and chancel. Exteriorly the construction will be in Belleville, N.J., stone above the water-tables in 12-inch courses with fine bush hammered faces and 1½-inch tooled margins; joints nowhere to exceed $\frac{1}{16}$ inch. The basement walls in granite, mouldings throughout are to be fine-rubbed. The height to the cornice of the aisles will be 32 feet, to the nave cornice 48 feet, to apex of main roof 71 feet. The extreme length from front face of tower to outside walls of chancel will be 150 feet, and extreme width from north to south transept porches 96 feet. Within the plan shows a nave 24 feet wide and aisles 12 feet; the transepts are to be 48 feet wide and project 12 feet from aisle face. The choir will extend 12 feet, and the chancel, which is nine-sided, will be 24 feet wide and 20 feet deep. At the angles of the choir and transepts octagonal rooms each 15 feet in diameter have been fixed, that on the right side as a vestry-room and that on the left to be occupied by the great organ. The main lobby under the tower will be 15 feet square; and before either of the transept entrances porches about six feet square have been fixed. The height of the tower will be to base of tower

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gables 77 feet, to top of same 117 feet, and to top of spire 195 feet 9 inches. The style mainly followed is the decorated Gothic of the thirteenth century, but there are so many variations and innovations introduced that this style remains only in a general way. One of the striking features on a first look at the church is the manner in which the tower and spire have been treated. The attempt has been to preserve an unbroken outline from the ground to vane. The sloping of the buttresses, the angle of the main tower-gables, the flying buttresses from tower corners to spire ribs, and the slope of the spire, are all arranged to heighten this monumental character of the spire. The buttresses throughout are moulded, and the pinnacles, which are crocketed, are finished with plain stops at the set-off and with gablets. The jambs of the entrance doorway are to be moulded, and enriched with shafts having moulded bases and carved capitals, the moulding carried about the arch. Above this is tabernacle or tracery work, divided into seven parts forming panels and windows, having shafts with moulded bases and carved capitals, crocketed gablets, and tracery enriched with cusps and other ornamental work. Above this the belfry window of four lights with mullions and tracery in the head; a hood moulding resting on corbels will extend over the opening, and intersect with crocketed gablets, and finish with a fleuron. The face of the enclosed panel above the arch is to be decorated with tracery and cusps; on the face of the tower overlooking the church roof, this window head only will appear as a spherical window [?]. The several buttresses of the tower will finish with crocketed pinnacles, the gables to be finished with moulded flower tracery terminating with cross fleurons. The spire will rest in an iron shoe-plate set upon the top of the tower. This will turn up six inches at the outer edge, and turn down 12 inches on the inner side of tower wall; farther up wrought-iron bands will be carried about the interior. The walls of the spire will be six inches thick at the base and five inches at the top. Its sides are to be pierced with eight narrow windows. All the walls of the church are crowned by cornices which are to be in single stone pieces between buttresses and to be hollowed out for ½″ galvanized iron trough with copper spouts to empty through gargoyle heads at the several corners. There are in all nearly a hundred of these monstrosities attached to the church walls. The nave and transept roofs will be slated, other roofs to be covered with copper, except porch roofs which are in stone. The cresting along the apex of the roofs and on the porch roofs will be in bronze. The only niches on the exterior are at the west walls of the transepts, where corbelled niches have been placed. The flying buttresses and the many pinnacles carried up here, there, and everywhere over the exterior present an appearance which by the general sight-seer is styled rich, magnificent, and beautiful.

Within the church the stone construction is of Berlin, Ohio, sandstone, though for the step to choir and chancel, and for panel-work in the chancel, marble is employed. The basement story will be 14 feet in the clear, and is to be fitted up as a Sunday-school room. Below the choir and chancel, however, a mortuary chapel will be arranged 22 x 31 feet. This may be entered either by sliding doors from the Sunday-school room, or by a stairway from the organ room, and by an ante-chamber. From the right side of the chapel another ante-room, 10 x 10 feet, leads to the crypt, which is directly under the octagonal robing-room. The crypt is 16 feet across, and 18 feet high. In two of the sides windows open, in another the entrance, at which an elaborate bronze gate will be fixed. The remaining six sides of the room will be fitted up with niches; at the angles triple columns in colored granite or marble will be placed, and from their capitals ribs of white marble will extend to a series of bosses about a well-hole above. The ceiling, groins, and vaulting will be entirely of white marble. The opening in the ceiling will be filled in with heavy plate glass as part of the robing-room floor. In the centre of the crypt floor a pair of sarcophaghi will stand, to be tenanted by Mr. and Mrs. Stewart respectively. By the use of color and carving in rich and rare stone it is intended to make this crypt the most impressive portion of the structure. The work on this coffin-room will be by special contract, at a cost of over twenty thousand dollars. The floor of the church proper will be of iron beams with brick arched filling, supported on iron columns. The columns supporting the clerestory and the transept arches will also be of iron, clustered in imitation of the usual stone forms. It was at first intended to have these columns enamelled and colored to represent rare polished marbles; but this palpable fraud was abandoned, and now it is proposed to bronze them. About the walls a wainscoting in stone panel-work will extend also into the vestry and above the interior of the porches. The window jambs of the lower and also of the clerestory windows will be in stone. The sides of the chancel will be in stone up to the window-sills. In three of these sides white marble slabs will be inserted for the usual holy inscriptions, and the other sides will accommodate five sedilia and a piscina. On either side of the chancel arch, on the walls of the choir, will be tracery enclosing tablets of white marble connecting with a corbel, over which is a niche with crocketed canopy enriched with buttresses and crocketed pinnacles. This pair of niches will be occupied by statues of Mr. and Mrs. Stewart. At either end of the transepts screens of stone panel-work will surround the transept entrances; and at the main entrance, at the rear side of the tower, there will be an open window to the interior of the tower, the tracery extending nearly to the top of the nave. On the centre mullion a corbel is placed for a statue, while the upper section of the tracery in the window will be occupied by a clock face. Half columns in iron, corresponding with the iron columns of the nave walls, will be planted against the aisle walls, and up through the triforium similar half columns will be carried up to the spring of the roof vaulting. The arches supporting the clerestory will be of stone; but the panel-work representing the triforium will be in plaster, as will the ribs, bosses, and panelling of the nave and aisle ceilings, tinted to Berlin stone color. The windows are to be filled in with most highly colored glass, while in the tower the set of 13 chime bells from the Machinery Hall at the Philadelphia Exposition will be placed. These bells have a total weight of twenty thousand pounds of metal, and were purchased expressly for this church. The height of the interior is as follows: to apex of nave ceiling 53 feet, to apex of aisle ceiling 26 feet, to apex of chancel arch 37 feet, the chancel floor standing three feet above the nave floor. The church floor will be laid in marble tile, and it is not intended to place pews, but have the interior free for promenade, temporary seats to be placed in during services. Across the front of the choir, separating it from the body of the nave, an elaborate bronze rail will extend.

The cost of the whole structure has not yet been calculated; and from the piecemeal style of composition followed full contracts have not been possible, and the cost will necessarily run above what it otherwise would have been. The drawings were prepared by H. G. Harrison, best known as the builder of the Manhattan Market in this city. Much surprise is occasioned at the fact that the commission for the designs of such an important building should have been placed in comparatively unknown hands. Already the criticism has been very sharp, and several of our most experienced city architects have visited the works. The completion of the building is looked for about the close of 1878.

HOW THE ROCKFORD COURT-HOUSE WAS PLANNED, AND HOW IT WAS BUILT.

CHICAGO, June 18, 1877.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — Although you have already devoted considerable space in your valuable journal to matters connected with the Rockford disaster, yet I think I do not mistake your willingness to do still more in the same direction, provided any new information can be imparted, or if any mistaken conclusion can be corrected.

Of my relations to the actual construction, and the part I took in the erection of the building, you are already informed. It seems to me that the interest to the building public, in all this controversy, is centred in these questions: How was the work actually designed to be built? and what was the character and nature of the information imparted to the contractor, that he could properly construct it? How did he construct the work? and in what way did the accident occur? Accompanying this communication are drawings respectively numbered 1, 2, 3, 4, and 5. Nos. 1, 2, and 3 show the elevation, plan, and section of the work as it was intended by me to have been constructed. It will be necessary to supplement this question, "How was the work actually designed?" etc., by stating the exact condition of plans issued, and of the information given. Originally the plans made and sold to the county contemplated light construction with light metal cornices, etc., which were afterwards changed to stone. These modifications were *indicated* upon the old plans, and *figures* wherever necessary were changed to conform to the new construction. Among them were these *bearing walls* or "*piers*," which were increased in thickness to the length of four bricks, producing the particular measurement of 2 feet 10⅛ inches. The walls at these bearing-points, originally double with air space between, were made solid (see supplementary report of experts, first story plan mentioned as colored solid in contractor's copy in *American Architect* of June 2), and bond stones introduced. At this time I made computations of the weight to be carried (from the best authorities), and my result was something over one hundred tons upon each column. My remembrance is, that it did not exceed fifteen tons over. And I made oath upon the first day's investigation before the coroner's jury that I had computed the weight to be a little over one hundred tons, and I had previously informed the contractor of my computations; and as the peculiar location would not allow of any thicker wall without disfigurement to the room, or obstruction in the vault or room, I adopted this form of construction. Being satisfied of the sufficiency of the bearing-walls for all that was expected to be imposed upon them, I issued a *full* set of working scale plans to the contractor, with these important points fully explained by figures and coloring of plans, and a ½ inch scale sketch of these "piers" (as indicated by "No. 3" of the drawings sent to you), besides verbal information and instructions. I have never considered these to be isolated "piers:" if they were, it would have been indeed a gross error to have designed them; but they are continued walls, which, at the centre of a positive weight above, are increased in thickness, forming pilasters, but which have been miscalled "piers;" and the fig-

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ures given by the experts have been based upon isolated piers, for they give but the area of the solid part (6.7326 square feet), hence my calculations have been misjudged.

And while on this subject, I wish to revert to the report of another committee, organized since the county board commenced its sessions, and in which report Gen. Smith, one of the committee, states that a bearing-stone twelve inches wide and sixteen inches long, and bearing only on the twelve-inch portion of the hollow wall, has a load to carry of *eighty tons.* "The wall, acting as a beam, *transfers a portion of its weight to the adjoining supports*, and so failure is for the time being prevented." The explanation of the support, as "acting as a beam," is just what I expected of my "piers" of over six square feet each and continuous walls to do, and which they could have done with ample security and strength, had they been constructed as they should have been; for the extreme weight should not have been over one hundred and thirty tons.

My computation of the weight was made from walls of twenty inches thick, while at projections it was greater. In actual construction two sides of this pavilion were increased from twenty inches to two feet six inches thick, unknown to me. This was done by the contractor without consultation with any one that I know of. The estimate made by the experts was from measurements at the building; hence a considerable increase over my result.

To sum up, then, *it was designed* that continuous double walls, increased to a certain solid thickness, and with bond stones, should carry a weight which with proper distribution, as provided for in design, would not have been, at the extreme, ten tons per square foot; and sufficient drawings and specifications *were* furnished the contractor to build to such a result.

Referring again to drawings Nos. 1, 2, and 3, it will be seen that upon each plan there is a certain fixed point within the solid part indicating a central point. This is the vertical line of pressure from the centre of the column in second story, and was the centre of the square of two feet four inches, the size of *all* the bond and bearing stones, through the thickness of the walls; but as the walls were thicker by six inches, it left a face work of brick entirely concealing the bond stones from outside view. The object of this was to protect these *lime stones* from exposure to accidental fire, as they were within the walls of a fire-proof vault, and sustaining great weight. Experience in the fires of Chicago had taught me thus to protect them. Headers were specified every fifth course in the brick; and if placed as I had directed them, and as shown in "No. 1," it will be seen that the strength of the outside face was not lost to the sustaining power of the walls. These walls were, at the floor line of each story, to be stayed by the beams of floors upon the one side, and the solid brick-work of arches, with their *tension rods*, upon the other. Finally, with the specifications as quoted in the report of the experts as to quality of work (except that for these vaults it was particularly specified to be the "hardest burned brick"), the information and drawings, as I intended the work to be, is complete.

The first editorial in the the *Architect* of June 2 says that the committee of experts were not consulted relative to the contract between myself and the county: it is also quite true that they were not instructed by those that employed them to consult me in *any particular*, and, setting aside a few minutes when they called me in on their own responsibility, after learning from Mr. Bauman that I had given him important information relative to the vertical bearing from the centre of the columns, I had no consultation with them at all; and further, this committee was provided not with the working scale plans furnished to the contractor to build by, but with the old originals, as modified for purposes of reference and record. I think this committee did nobly with the information at their command; but they did not do me justice, for they were deprived of the means to fully inquire into all particulars. The contractor suppressed his plans, sketches, and withheld every thing he could that would in the least criminate him; and he has been eminently successful in the result.

The jury who employed these experts, from the outset, seemed to consider that I was the one person to avoid; and no *consultation*, or *any recognition* of my past connection with the building, was made, except by direct *prosecution* before them. I was, as I have said before, pre-judged; and although I was supposed to be the arch(fiend?)itect upon whom this foul charge of manslaughter should rest, and that I was supposed to be fully informed as to all the particulars of the construction of the building, yet, when experts were employed, they were instructed to go about their business without consulting me. There is not an architect of any extended practice, who does not know that there are many important instructions and much important information given verbally to the contractor as the work progresses, that it would depend upon the honor and honesty of the two to bring to light, if inquired for. Accordingly, in my case, I was at a great disadvantage to bring the truth before the public.

The question, "How did he construct the work, and in what manner did the accident occur?" can be very briefly answered.

The report of the experts already published fully explains the work and the material, and the quality of each; but to their theory of the cause of its failure, I do not wholly agree, at least not as represented by the drawing accompanying it. By referring to "No. 4" of my sketches, the walls and "piers" as actually constructed will be seen. It was arbitrary that the iron column in the second story should be placed at the exact point designated by the figures on the plans throughout, in order to meet exactly the construction over: hence by the reduction of the pier from 2 feet 10⅛ inches to 2 feet 5 inches, the iron bearing-plate *did* overhang the pilaster on the inside 3⅛ inches and the bearing-stone 5⅛ inches; and this overhanging portion had no bearing (except on cinder concrete put in contrary to specification); accordingly as shown by "No. 5," with a weight estimated at the time it fell of 102 tons on the iron column, there were between the points "C" and "D" 51 tons, and between "D" and "G" 51 tons. The greatest accumulation of weight was at the point "C;" and if this pier under had been of cut stone solid, the result would have been the same, for the bearing-stone could never have stood such an unequal pressure, even had the pier been capable of carrying it; but as it was, day by day they piled on more weight and came at last to the final "straw," and the crushing commenced. I think it was but the question of a few minutes, after the first few fissures in the brick were made at "C," to travel quickly to the large crack reaching down to the skewback (which was another innovation of the builder), and then the 102 tons were entirely outside the axis of the column between the points "E" and "F." To use the words of the contractor as nearly as I can remember, as he informed me of the accident the day after, "I was under these columns and in the first story fifteen minutes before it fell, examining the walls, as is always my habit to do on every building when I am putting on more weight; and I did not see any crack or settlement nor indication of giving away; and just before it fell Mr. Latham (the superintendent) and myself were congratulating each other on the progress and success of the work, when I felt a sudden sinking under my feet (he was then on the main roof to the rear of the pavilion) and I sprang to the main wall just in time to save myself, when I saw the *west column supporting the pavilion shoot out and go down.*" Can there be any better explanation of drawing "No. 5"? I have no doubt that these walls were fair and sound to outside view up to within *two minutes* of the time that they fell: the secret lay hidden underneath the concrete at the back. The horrible man-trap was set when the bearing-stone was set, and only required that last crowning stone to spring the trap, and plunge into eternity those unfortunate victims. The *Architect* criticises my letter to the Chicago *Tribune* so far as to say that as I made no mention in it of any original computations as to the strength of walls, hence it is to be supposed that I never made any at all, and "that they were designed by rule of thumb." The omission to *mention* my computations in that letter, I will admit, was done "by rule of thumb," or rather through the crowding out of it by other thoughts, and my omission or failure to explain some other point may yet be called in question; but there is one clause in that letter I wish to call attention: to it is next to the last one. I say, "I furnished to this jury all the information *in my power.* I have distorted and concealed nothing." I might have added, that I could have placed more information before them than I did, had it been *in my power;* but I was deprived of a fair hearing, my own statements were purposely misconstrued, my witnesses were insulted and "bull-dozed" (excuse the vulgarity, it is pertinent), and many of my own questions sent up in writing to the coroner to be asked witnesses who appeared against me were actually torn up, or thrown under the table, and were made no use of (I have a number of witnesses to this fact); and I was informed by my attorney I could not help myself as they (the jury) had the law in their own hands, and could do as they pleased. I have not brought this out here to exhibit my personal troubles or difficulties, but to show that where I should have had a fair hearing, and where I should have been able to have brought out these facts, I was entirely unable to do so. The morals that have been drawn by the *Architect* from this and other similar sad events are admirable; and I only hope that it may be of benefit now that the disaster has occurred, and that future edifices and their designers may be permanently benefited and improved; and as for myself, where I am wrong I shall not be slow to acknowledge and accept it, and improve thereby. There are matters of practice and business management that I am at fault in, and it has placed me at a serious disadvantage; but as for my drawings and their practicability, I refer you to almost the opening clause of the experts' report, which says, "The plans and specifications have been very carefully drawn with the exception of a few omissions:" these omissions were made up in detail, scale, working plans, and sections, as well as verbal instructions given the contractor, which the committee were unable to get at, or were not aware of.

The verdict of the jury has gone out to the public, that I am the almost sole cause of the disaster; but its legal consequences upon me or anybody else concerned are harmless; it has no effect, and ceases to exist except in remembrance.

The County Board has since convened at a special session; they listened to my proposition and to those of the contractor, but chose to select another expert committee to receive plans upon the reconstruction. I presented to that committee plans and specifications for such work: they chose to make plans of their own (which are

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in the main identical with mine); these they presented to the board together with specifications for strengthening the work that was shattered by the fall of the pavilion. The contractor made a bid for such work amounting to $16,000, which was accepted by the board, causing the county to assume all liabilities for damages. The old superintendent presented his resignation; a new one was appointed by the building committee, who is a local architect of Rockford, and a thoroughly capable man; and I am as I was, architect of the building, but with no more responsibility in its construction than I had before. Respectfully,

HENRY L. GAY, *Architect.*

[We print the foregoing letter from Mr. Gay, the architect of the Rockford Court House, because the case is one of special interest, and because in one that so seriously concerns a professional reputation our readers who have followed the published accounts ought to know on what the architect relies for justification. It should be understood, however, that we cannot ordinarily be expected to give up so much of our limited space, or ask so much of our readers' attention, to letters of personal explanation and personal reproach. — ED. *American Architect.*]

INTERIOR DECORATIONS.

I HAVE followed with much interest the series of articles on "Interior Decoration," prepared for the *Architect* by Mr. Van Brunt. The theory that architecture and decoration should combine and harmonize, with no discordant notes or harsh gradations, is not new; but it is only within a few years that its study has been taken up systematically and with a desire to attain to a better knowledge of its underlying principles. Seventy years ago, the students of interior decoration and furnishings and the collectors of bric-à-brac were looked upon as harmless enthusiasts, or even as frivolous and effeminate pedants.

In 1807 Thomas Hope published in London a folio of 173 pages, entitled "Household Furniture and Internal Decorations, executed from Designs," which was taken up by the *Edinburgh Review* of the same year, in a manner that shows the feeling of the period.

"At a time," says the reviewer, "when we thought every male creature in the country was occupied with its politics and its dangers, an English gentleman of large fortune and good education, has found leisure to compose a folio on household furniture. We do not think this would have been much to his credit, even if the upholstery had been more laudable than it is. A man of taste, if he be also a man of leisure, will show it, no doubt, in his furniture, as well as in his dress; but he will infallibly make himself ridiculous in this country if he make a study and an occupation of such frivolous concerns. What should we say of a young nobleman who had studied and travelled, and drawn and modelled, for many years, in order to acquire and describe a collection of classical wigs, spencers, boots, and pantaloons? And what better are Mr. Hope's stools, fire-screens, candlesticks, and dressing-glasses? There is in England, we believe, a pretty general contempt for those who are habitually and seriously occupied about such paltry and fantastical luxuries; and at such a moment as the present, we confess we are not a little proud of this Roman spirit, which leaves the study of those effeminate elegancies to slaves and foreigners, and holds it beneath the dignity of a free man to be eminently skilled in the decoration of couches and the mounting of chandeliers." The critic here takes up Mr. Hope's style of composition, which he handles none too severely; for in verboseness and high-flown sentences it "really deserves some commemoration for the pre-eminence of its solemn foppery;" adding that, "As the great price of the volume puts it out of the reach of ordinary readers, we shall make a few extracts just to let them see what kind of books fine people pay ten guineas for."

After an introduction of twenty pages, the author proceeds to describe the difficulties he had to surmount in the preparation of his work, and in finding proper artisans to carry out his designs; and he strongly advocates the principle that each article of furniture should be ornamented with emblems expressive of its use and derived from classic mythology, as appears from this description of an organ: "The car of the god of music, of Apollo, glides over the centre of the pediment. The tripods, sacred to this deity, surmount the angles. Laurel wreaths and other emblems belonging to the son of Latona appear embroidered on the drapery, which, in the form of an ancient peplum or veil, descends over the pipes of the instrument, and gives it the appearance of a sanctuary." Why an organ should have the appearance of a sanctuary, is not easily explained; but the idea seems simplicity itself, compared with the decoration of a mantel-piece on which are two boldly-projecting horse heads, placed there for the reason that there was a bust in the centre, inscribed with the name *Philip*, which, we are told, signifies in Greek a lover of horses.

To enter one of the apartments described by Mr. Hope without a Virgil to explain the mysteries, would be to find one's self in a labyrinth of untranslatable mythology. Here is the description of an apartment, the use of which is not given: —

"The central object in this room is a fine marble group executed by Mr. Flaxman, and representing Aurora visiting Cephalus, on Mount Ida. The whole surrounding decoration has been rendered, in some degree, analogous to those personages, and to the face of nature, at the moment when the first of the two, the goddess of the morn, is supposed to announce approaching day. Round the bottom of the room still reign the emblems of night.

"In the rail of a black marble table are introduced medallions of the god of sleep and of the goddess of night. The bird consecrated to the latter deity perches on the pillars of a black marble chimney-piece, whose broad frieze is studded with golden stars. The sides of the room display, in *satin curtains*, draped in ample folds over panels of looking-glass, and edged with *black velvet*, the fiery hue which fringes the clouds just before sunrise; and in a ceiling of cooler sky-blue are sown, amidst a few still unextinguished luminaries of the night, the roses which the harbinger of day, in her course, spreads on every side around her.

"The pedestal of the group offers the torches, the garlands, the wreaths, and the other insignia belonging to the mistress of Cephalus, disposed around the fatal dart of which she made her lover a present. The broad band which girds the top of the room contains medallions of the ruddy goddess, and of the Phrygian youth, intermixed with the instruments and the emblems of the chase, his favorite amusement. Figures of the youthful hours, draped with wreaths of foliage, adorn part of the furniture, which is chiefly gilt, in order to give more relief to the azure, the black, and the orange compartments of the hangings."

The concluding lines of Mr. Hope's introduction may well be quoted here, as they contain a kind and earnest warning to any young artist who may become the possessor of his book, "not to confine his exertions to a mere servile copying of its contents."

In bringing once more into notice an almost forgotten work of the past, I have endeavored to show how much the present generation is indebted to the efforts of their predecessors in fostering a taste for the true and beautiful.

Struggling against ridicule and a vitiated public taste, it is not surprising that they were often crude in their conceptions, or that the descriptions of their designs are any thing but satisfactory. But it is evident from all that they have said and done, that their hearts were in their work; and if they accomplished but little in their day and generation, we owe to them our gratitude for a step in the right direction, at a time when so little was thought of household art.

G. C. M., JUN.

IMPROVING WILLIAMSTOWN.

NEW YORK, June 20, 1877.

TO THE EDITOR OF THE AMERICAN ARCHITECT: —

Please state that the designer of the admirable work at Williamstown, incorrectly referred to the undersigned in your last number, is Mr. B. S. Olmsted of Rye, N.Y.

F. L. O.

SECURITY IN BUILDING.

[From a lecture by Prof. Barry at the Royal Academy.]

LET us now consider for a few moments the peculiar requirements of modern cities, as they present themselves to the architect.

Any large assemblage of people in one place must, of course, give rise to difficulties as regards the provision of healthy dwellings. A cottage standing in its own grounds may long be deficient in many things, without causing more than a passing inconvenience. Soon other cottages are erected near it; these press one upon the other, till waste spaces are covered and houses touch. The ditches are defiled, springs are polluted, verdure is banished, and the air is thick with smoke. The former country hamlet is now the centre of a great town, the only home of its poor, and only too often the hotbed of crime and vice. What can architecture do in such a case, but wait and plead until the public sense of responsibility is roused to insist on the necessity of wholesome habitations for all classes? The architect may then point out the advantages that may accrue to the entire community by making arrangements which, while removing reproach, may add interest, convenience, and beauty to our cities.

But it is with other classes of buildings than the houses of the poor that we have to deal. While these need not be ugly, they cannot, of course, add much to the architectural ornaments of a great town. Such ornaments must be looked for in the public buildings, the banks, mercantile offices, and the dwellings of the wealthier inhabitants. On all public improvements, it has long been admitted that the public has a right to speak. But though the principle has been admitted, the application of it has hitherto been far from complete; and even in utilitarian matters it is to be feared that some terrible catastrophe may one day startle the public mind by the revelation of deficiencies in our legislation, as applied to the buildings in large towns.

Now, I yield to none in affirming that an architect must bear all fair responsibility; but if it be made clear that our public regulations are insufficient to secure good building, and even to provide for the safety of the public, it is evident that in this free country, in which the popular voice is all-powerful, the real responsibility must rest with the public itself.

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Architects are constantly publicly instructed with emphasis, by self-constituted advisers, as to evils in our buildings, some of which are imaginary, while of others they are well aware; and remedies are presented with all the confidence natural to irresponsible critics. But it is forgotten that such remedies would frequently bring inconveniences of their own, and that they are generally costly, and would therefore raise rents. Houses in London are moreover mostly built on land which is leased for a term of years, which, I am sorry to notice, is becoming more and more restricted in some recent leases. Doctrines of tenant rights have not reached the metropolis; but it is idle, in my opinion, to hope for substantial improvement in our domestic architecture, as long as men are called upon to build for the ultimate advantage of others. It is scarcely too much to say that in solidity of construction, and in provisions for safety in our places of public resort, we are behind most, if not all, of our European contemporaries. These are matters which are most important to the architect; for without good and solid construction, architecture is a sham.

We know how careful the Romans were as to the corridors and exits of their theatres; and their work will remain as a guide to future ages, after many of the flimsy structures of to-day have totally vanished.

If the architect be, as I have said, greatly interested in these questions, they are to the public of vital moment, and it is for the public to deal with them through its chosen representatives. It is useless for an architect to provide exits in his plans, which are afterwards built up and disused because each doorway is a source of expense to the management; and there is no encouragement to design good houses, as long as people prefer low rents to healthy homes.

In country places, where buildings are perhaps placed in spacious parks isolated from all contact with others, it may doubtless be contended that any regulations in the interest of the public are uncalled for, and would be an unnecessary interference with individual liberty. But in towns the case is different. Here a man cannot live only for himself: he must so enjoy his own rights as not to injure his neighbor's. The principle of building-regulations has long been conceded, and it only remains to determine their extent and application. Such regulations are, indeed, essential to the well-being of the community in modern cities.

Having already spoken to you on the question of materials, and their effects on originality of architectural design, I will not dwell again upon that part of the subject. As, however, I have referred to danger from fire, I may perhaps be allowed to say a word as to the use of incombustible materials in our dwellings and public edifices. We do not need to be reminded how terrible an enemy fire is to architecture and to human life. We know what it has done in former times to London, and the misfortunes of Chicago and Boston are recent. Hardly one of our theatres has escaped, and few even of our cathedrals have not been injured or threatened. It is therefore unnecessary to say that architects are bound to study this question, which is far from simple. Where a great body of fire exists, as in a warehouse stored with inflammable substances, such materials for supporting fire bear so large a proportion to the constructional portions of the building that the latter are simply overwhelmed, and wood, stone, iron, marble, and brick are involved in one common ruin. This has led some persons to think that a fireproof building is impossible, and perhaps in the strictest sense it is. Not so however, practically, in the vast majority of cases with which architects have to deal. Because iron and stone have yielded when exposed to intense heat, it does not follow that they may not be employed with advantage when all the circumstances of each case have been fully considered; and I cannot subscribe to the doctrine that in public buildings it is better that the stairs should be made of wood, which will burn, rather than of stone, which will not.

There is and should be no difficulty, at any rate, in so constructing our domestic architecture that the existence in our houses of any large body of flame sufficient to cause danger to materials not in themselves capable of ignition, should be a physical impossibility. Unfortunately, this is seldom or never done, from causes to which I have already adverted. Houses are built to last for a term of ninety-nine or even eighty years; and their builders prefer to pay premiums to fire-offices rather than to invest additional capital in their buildings so as to render them permanently safe from danger by fire.

The application of incombustible materials to ordinary buildings is still in a backward state in England, more so by far than it is in France, for example; and with reference to theatres it has scarcely been seriously attempted. In these buildings the stage and its appurtenances must probably be always more or less inflammable, although chemistry may help us in this respect; but as regards the auditorium, no difficulty exists which is not to be surmounted by any skilful architect, and a dangerous fire in this portion of the building ought to be an impossibility.

It is, indeed, even now panic, rather than actual fire, that constitutes the most terrible danger in case of accident; and if the audience were conscious that the construction was as it should be, if they saw wide corridors and ample staircases of materials which will not burn, we should never again have to deplore such a calamity as the American catastrophe already adverted to.

NOTES AND CLIPPINGS.

FALL OF A FRAME CHURCH. — An unoccupied building at the corner of Graham Avenue and Devoe Street, Brooklyn, E.D., fell on Saturday evening. The building was of wood, built upon brick piers, and was 125 feet long by 45 feet in width. It was erected about fifteen years ago for the accommodation of a congregation that had deserted the Graham-avenue Methodist Church. Of late the building has at intervals been used by minstrel troupes, etc. It has been deserted for about a year by all except mischievous boys, who knocked away several of the piers upon which it rested. For months it has been in danger of falling; and the Fire Department has several times notified a man who is reputed to be the owner of the building to repair it. The loss caused by the accident is small.

A MEMORIAL WINDOW. — A memorial window to the memory of the late Henry A. Sims, architect, of Philadelphia, and to the memory of his son John Clarke Sims, has been erected in the Episcopal Church of St. John, Prescott, Canada. The window is of two lights; the first division bears the inscription: "Henry Augustus Sims. Born Dec. 22, 1832; died July 10, 1875;" and the second: "John Clarke Sims. Born May 4, 1866; died March 5, 1874." The subject treated is "The Song of Simeon." The window was designed by the late Mr. Sims himself, when his child, John Clarke Sims, died. Before the work had been commenced Mr. Sims followed his son to the grave; and the window has now been put in by Mr. Spence himself as a token of his friendship for the deceased. There is something peculiarly appropriate in the placing of this window in St. John's Church, Prescott, — a church which was designed and erected by Mr. Sims, and which was, indeed, his earliest work.

THE EFFECTS OF A GALE. — On the 20th inst. a north-western gale did much damage in Iowa City, Io., overturning chimneys, blowing down trees and fences, and injuring the crops in the surrounding country. The steeple of the Presbyterian Church, with part of the building, was blown down; loss to the church about seven thousand dollars. The spire of the Congregational Church was wrenched out of the perpendicular, and its foundation cracked so that it must be replaced.

ST. PETER'S CATHEDRAL, MONTREAL. — The most remarkable, though not the largest building in Montreal, is undoubtedly the new Cathedral of St. Peter, an exact model on a reduced scale, it is said, of St. Peter's at Rome. The walls are now about fifty feet high; but for the present work has come to a standstill, as it is the custom of the Roman Catholics there to build only as long as the money comes in, whereas the Protestants finish their churches at all hazards, and then mortgage them to the last brick to satisfy the builders' claims. The most striking feature about the cathedral at present is the absence of windows, which gives it a very barn-like appearance.

ANOTHER ACCIDENT IN THE BERGEN TUNNEL. — As seven bricklayers were at work on shaft No. 2 of the new Bergen Tunnel on Saturday, June 16, a bucket containing about eight hundred bricks was carelessly lowered, and striking the scaffolding, on which there was also a quantity of bricks, broke the timbers, and hurled the men and bricks in a mass to the bottom of the shaft, a distance of fifty-five feet. No one was killed; but all the men except one were badly mangled. The cause of the accident was a broken beam in the scaffolding. D. Cavanagh, the foreman of the gang of bricklayers, who was one of the victims, was aware of the danger on Friday night, and gave orders that the beam should be repaired at once. For some reason his order was disobeyed.

A BORROWED BELL. — St. Peter's Episcopal Church of Uniontown, Penn., has been using a borrowed bell since 1842. The bell was loaned that year by St. Peter's Church, Philadelphia, and recently the wardens of the latter church made a demand for the bell, which has been shipped to them. According to the inscription on it, the bell was cast in 1711, and is consequently 166 years old.

A NEW CANAL. — Señor Rafael Nunez, a prominent citizen of the Republic of Colombia, has arrived in this country in order to arrange for cutting a canal from Cartagena to the River Magdalena. The object is to throw open the Colombian territory to American trade, instead of allowing it to be monopolized by English traders. The canal would be about sixty miles long at least, but we believe there is a canal already connecting Cartagena with Sabauillo at the mouth of the Magdalena, which can be used for about half this distance. It is thought that $200,000 will be quite enough to cover all expenses.

THE BYRON MEMORIAL. — The memorial committee have selected the design of "Richard Belt," in which the poet is represented as seated upon a rock.

THE LUXEMBOURG. — The Luxembourg Palace in Paris will soon be enlarged by the addition of a new room on the ground floor of the north wing. This room will be lighted by eight large bay windows, four of them opening on to the garden and four on to the court. It is intended to be an extension of the sculpture gallery. The old staircase leading to the upper floor will remain as it is, the expense and difficulty of replacing it with a better one being considered insuperable.

DRY ROT. — The *American Journal of Pharmacy* says that the best preservative against dry rot is the following of Mr. Schwartze, who made millions by it, and by whose recent death the secret was revealed: one part oil of cassia, one part wood tar, and one part train oil; apply three coats on the reverse sides and on the ends of planks, floors, etc. In all probability oil of cassia played the chief rôle as preservative.

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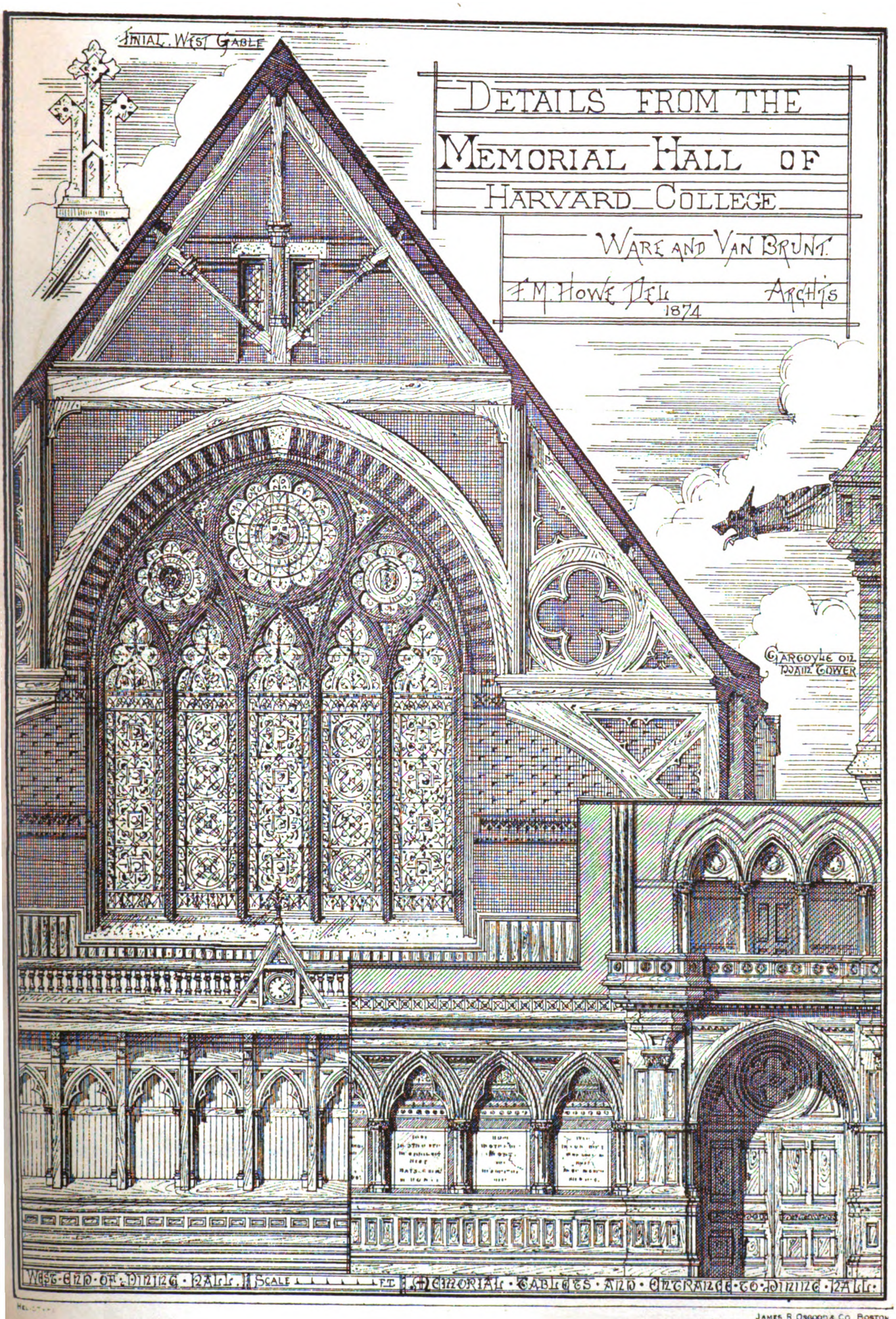

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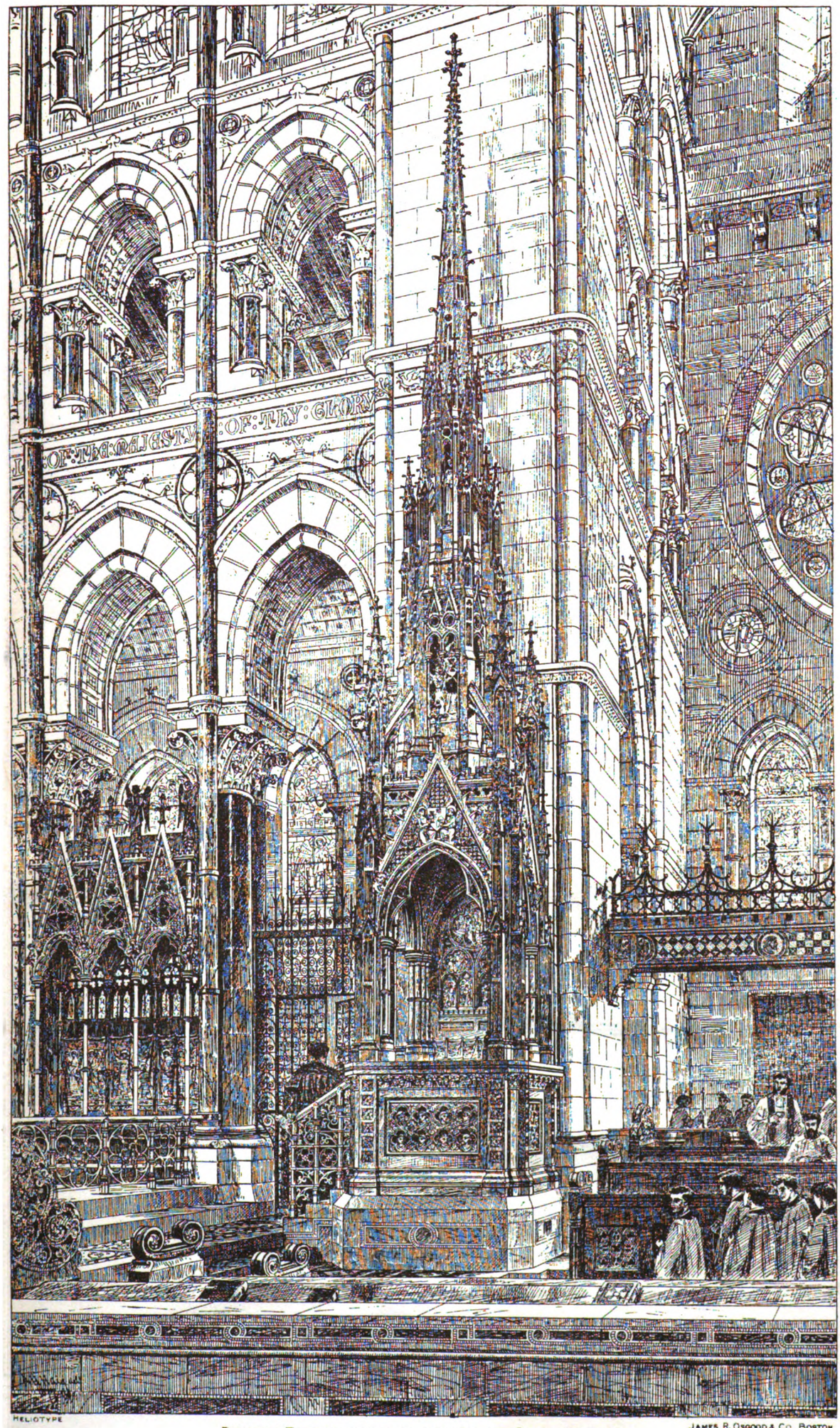

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BISHOPS THRONE NOW BEING ERECTED IN CORK CATHEDRAL
W BURGES, ARCHITECT.

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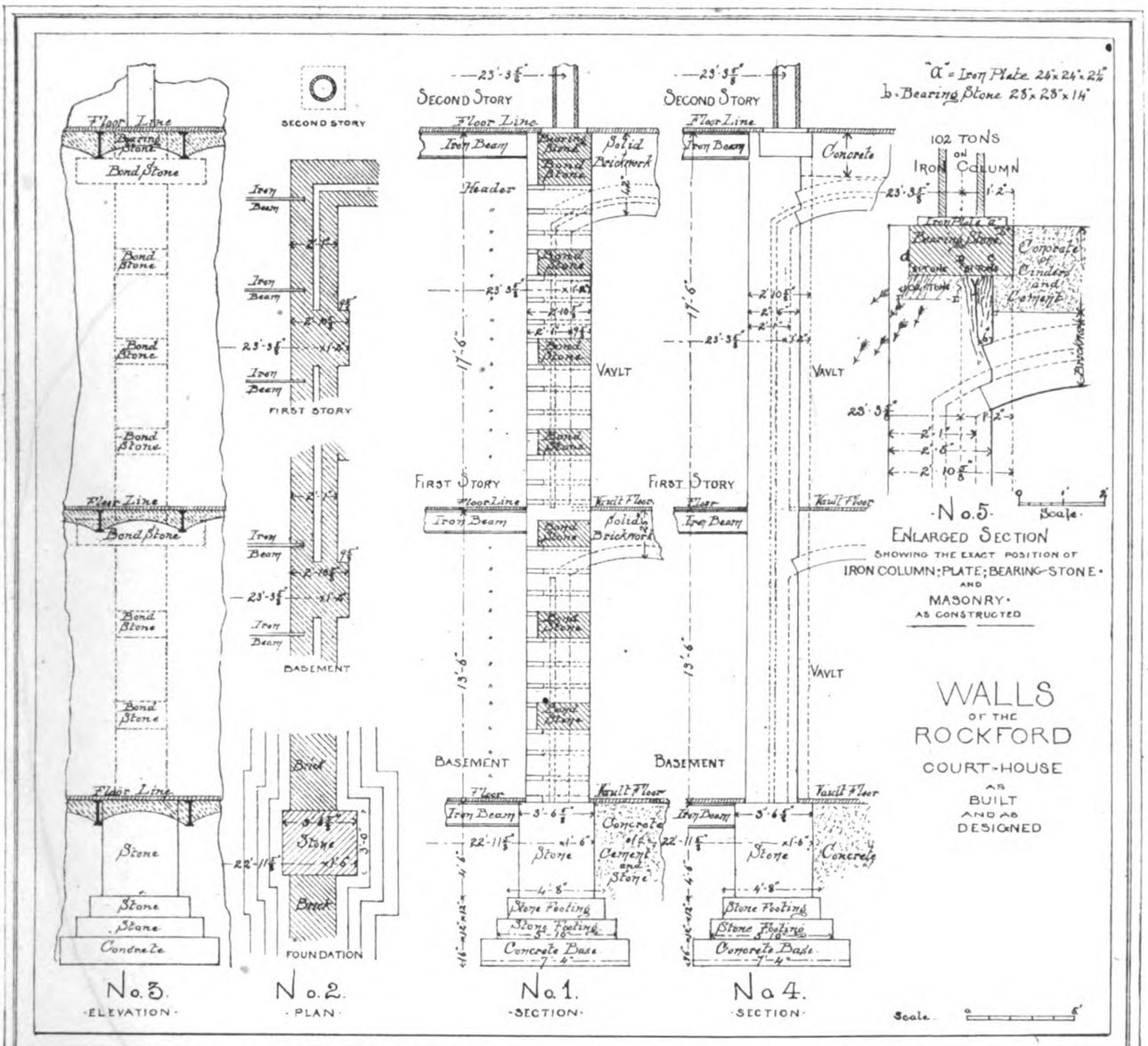

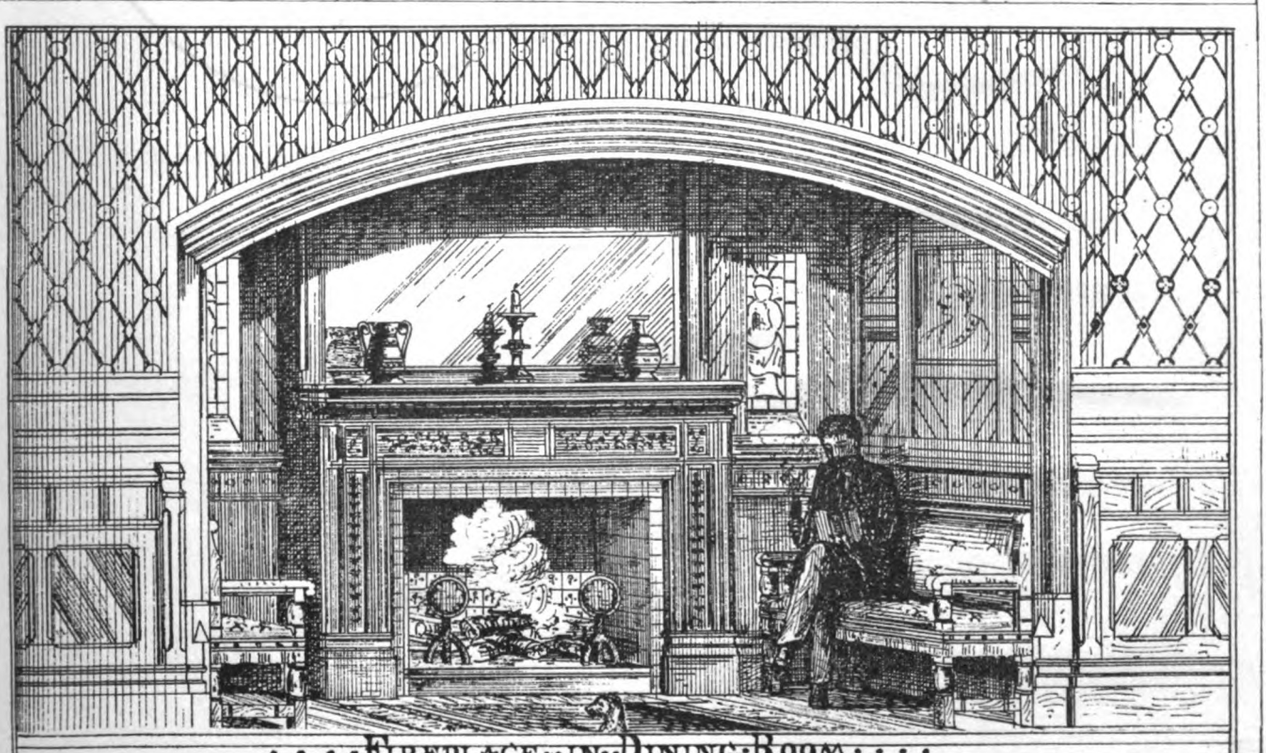

FIREPLACE IN DINING ROOM

OSSEO LODGE WEST VA

CARL PFEIFFER, ARCH.T

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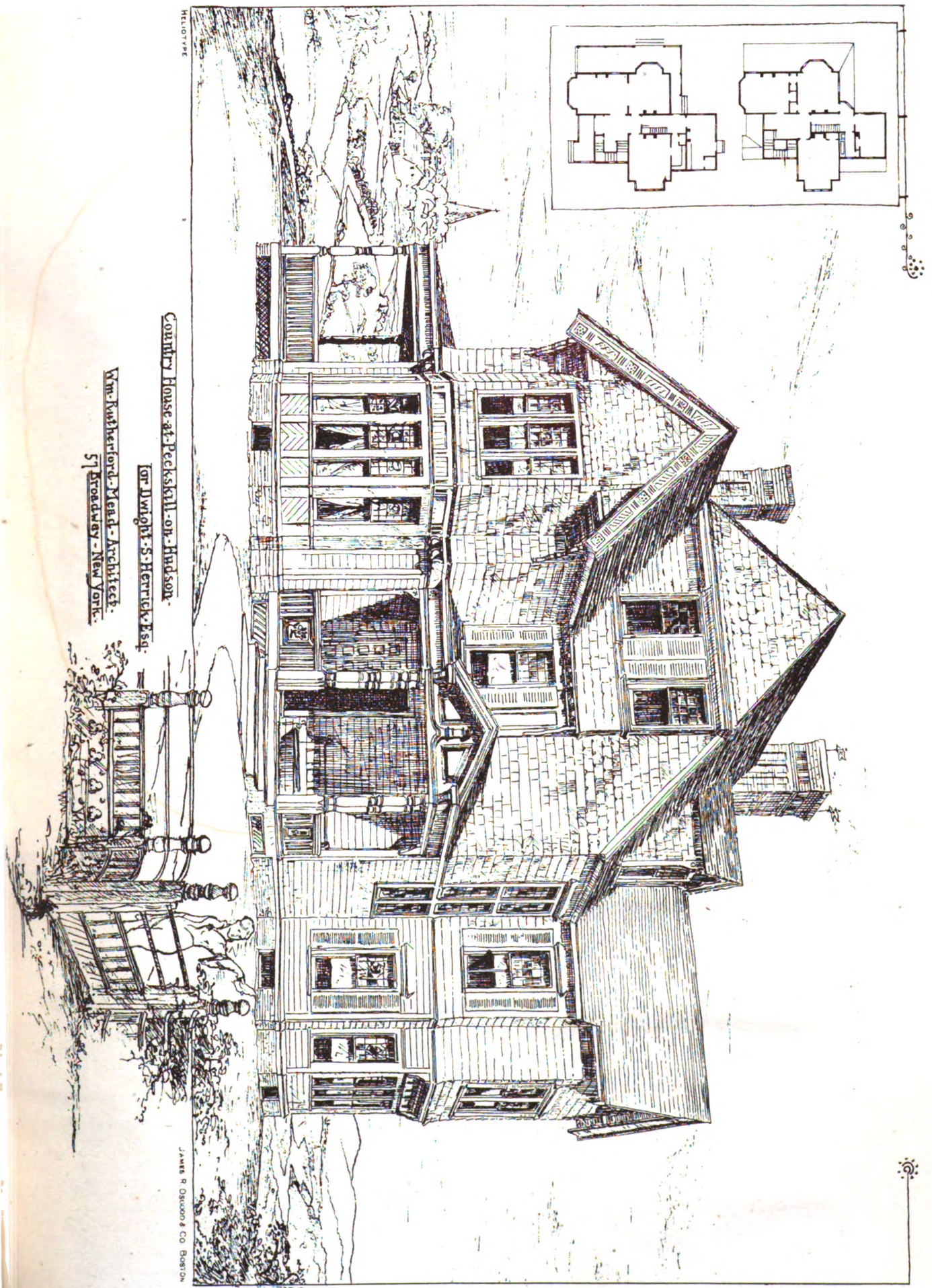

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, JULY 7, 1877.

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THE Report for 1876 of the President of the Massachusetts Institute of Technology, which has just been printed, is an interesting document, and covers a great variety of topics. Turning first to find what success has attended the architectural school of the Institute, the oldest in the country, we find that the extreme depression in architectural practice that has marked the year has not shown itself in the attendance here. The students, we are told, have been more in number (twenty-three) and of better quality than in other years. A special two-years' course of instruction, arranged with a view to the higher training of students who get their practical teaching in offices, has proved successful, and has attracted the greater part of the students in this department; the regular four-years' course, carried on in connection with other departments of the Institute and embracing a certain amount of general instruction, being followed by comparatively few. This is a convenience for students who have found other opportunities of following the collateral studies, mathematical and others, which an architect's educational outfit calls for; but where these are passed over, as they doubtless are by many students, the tendency to elect the shorter course is to be regretted. The last year's work of the department was well represented in the very creditable display made by it at the Centennial, of which an account is given in the Report, and which it is to be hoped most of our readers examined. We are glad to see it recorded that this school received its due share of the remarkable collection of casts of architectural detail which was the most interesting part of the artistic exhibit in the Spanish pavilion, — about fifty of the casts of Saracenic and Renaissance work having been given to it. The list of problems in architecture given to the two classes during the year shows the extent and variety of the practice that is set before them. We notice a porch, a campanile, a pavilion between two bridges, a staircase under a dome or vault, the restoration of a Pompeian house, a fountain, a memorial library, a railway station, a Catholic church, and others to the number of a score.

ONE of the most interesting parts of the report is the account of the workshops which have lately been added to the Institute for the purpose of exercising the students of mechanical engineering in the actual manipulations of metal-working. We have already mentioned (No. 61) the noteworthy success which attended the first opening of one of these shops; their further use has, according to President Runkle, fully borne out their early promise. There are now in working order shops for vise-work, — the use of the cold-chisel and file, — and for forging; a lathe shop and a foundry are to be added as fast as the means at the disposal of the Institute will allow. The Institute has been fortunate in securing for teachers in its vise and forging shops men of skill and long experience in practical work. The results of their careful and intelligent teaching have been a great surprise to mechanics who were accustomed only to the progress which is made by learners in the ordinary routine of shops. The example of this method of teaching was set, as is known, by the Russians, whose exhibit of the work of the Imperial Technical School attracted so much attention at Philadelphia. Their experience, which is cited by President Runkle, showed most decisively the wastefulness, as far as concerns instruction, of the system of learning a trade in the ordinary work of shops. The director of the Imperial school, the report says, has been authorized by the Russian Government to prepare for the Institute of Technology a duplicate of the exhibit of the school at the Centennial.

WE have also received the catalogue of the Illinois Industrial University for 1876–7, which is interesting to the profession for the information that it contains concerning the architectural school there. So far as can be judged from the catalogue, which does not include special reports of the various schools of the university, the architectural class seems to prosper; for of the one hundred and seventy-five members in the upper three classes thirteen are architectural students. This is a higher percentage than that of those who are studying mechanical or mining engineering, and does not fall much below that of those who study civil engineering. Of the forty-five female students in these three classes, only one is studying architecture; although one might think that the study of architecture and architectural designs, as pursued in schools, would be one of the studies most attractive to girls. That more have not embraced the opportunity is perhaps to be explained by the fact that few women are fitted to endure work so physically trying as that of the architectural draughtsman. We have before spoken in praise (vol. i. page 417) of the curriculum of studies prepared for the members of this class; and there seems to be no reason, provided the instruction is thorough and the pupils are willing to make haste slowly, why the graduates should not attain high rank in the profession. After the example of the Massachusetts Institute of Technology, a shop has been established and provided with full sets of wood-working tools, with which the students are to execute their own designs. During the first term instruction will be given in framing, splicing, panelling, dove-tailing, etc.; in the second term in turning, fret-sawing, veneering, carving, stair-building in all its branches, etc.; in the third term students will have miscellaneous practice in metal-work, painting, plastering, and stone-cutting, performing its various operations upon blocks of plaster. This is very satisfactory; and what we once said of the workshops at the Boston school we could say of this. There would be a certain convenience in an architect's or an engineer's being able to do with his own hands the work he has to direct others to do; though to become even passably expert in the use of carpenters' or joiners' tools requires more time than here seems to be appropriated to them: for instance, to become a good stair-builder is the work of several years' time, and here it is taught in three or four months. The main thing, however, is to acquire, not a mastery of manipulation, but a sufficient knowledge of its character and scope to know what it ought to be, and what it can or cannot do, so that workmen may be intelligently directed. Whether the courses at the Illinois University are intended to do more than this, or not, we do not know.

WE read with satisfaction at the same time, of the promised utilization of an old and rather fruitless institution for similar purposes. It is proposed to turn the famous Crystal Palace at Sydenham into a school for technical education. The London guilds have been interested in the project, and are expected to devote a portion of their revenues to it. There are some fourscore of these guilds in London, of varying importance, some of them having large revenues. They have for the most part ceased to exert any active influence on the trades they represent, and may be said to be out of work, though they retain their halls and give their annual banquets. It is reported that several of the leading guilds have agreed to contribute each two thousand pounds a year to the support of the school, while others have promised aid to it; and it is hoped that the ample endowment of fifty thousand pounds a year may be raised. These are the figures that the newspapers give; they certainly look large.

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HONORS are proverbially unapt to descend from father to son, except by formal inheritance. It is therefore a more than usually conspicuous distinction that the English Royal Gold Medal for architecture has been given to Mr. Edward Barry, the present president of the Institute, whose father, the famous Sir Charles Barry, had received it in his turn years before. Mr. Barry, who was educated in his father's office, and inherited in a considerable degree his professional bent and tastes, has won his distinguished position as much, we believe, by his cultivated professional scholarship, and by the honorable spirit and sound practical judgment which have marked his career, as by the excellence of his professional work. His last undertaking of note has been the arrangement of the new galleries for the Royal Academy at Burlington House. Prof. Donaldson, the Nestor of the Institute, in making the presentation took occasion to hope that the name of Barry might be permanently associated with architecture, and that a hundred years hence the family would leave behind them monuments worthy of the architect of the Houses of Parliament. Considering the changes in fashion that have swept over English architecture since Sir Charles Barry came upon the stage, it would be interesting to know in what style his descendants will be found working at the end of Prof. Donaldson's century.

A QUESTION of some interest touching the force of professional certificates has just been decided in an English court. A certain English company, building a railway in Russia, had contracted for rails with an English iron-manufacturing firm. The contract stipulated that the rails should be of the very best quality, should be manufactured under the supervision and in every respect to the satisfaction of the engineer, that he should have power to reject any that did not suit him, and that his decision on any points that might be disputed should be final and binding on both parties. It was added, somewhat inconsistently perhaps, that the examination by the engineer should not commit the company to the acceptance of any rails which when delivered were not found to be strictly in accordance with the specification. The rails were made in England; and the engineer, Sir John Hawkshaw, appointed a deputy to supervise their manufacture. The deputy, having seen them made and tested samples of them, reported in their favor to the engineer, who thereupon gave his certificate of satisfaction. The rails were delivered in Russia, received, paid for, and laid down; but the use and exposure of them during one winter showed them to be defective. Thereupon the company brought suit to recover damages against the contractors, on the ground that the rails were not of the quality specified, and that the contract contained no provision debarring them from recovering in such a case. They argued also that the clause that they should not be committed by the engineer's acceptance of rails that proved faulty on delivery gave them a right to recover. The judge ruled that inasmuch as no defects were discovered in the rails when they were delivered, the approval of the engineer must be considered final, and that the company's right to recover was destroyed by it. This decision touches a question often asked, whether an architect's certificate, which stands on the same footing as an engineer's, is to be considered as binding upon his client without remedy. The question did not come up, whether the client was bound to pay for work certified to by the engineer without regard to his own approval of it; but it is pretty clear that such an obligation is included in the judgment that the engineer's certificate was final, and we imagine that it would hold in the case of any work contracted for under approval of an engineer or architect, even without the express stipulation of the contract here mentioned that his approval should be final. The remedy in such a case then is in a suit not against the contractor, but against the architect or engineer. This leaves a good deal of authority and binding power over the client in his agent's hand; but it is in the nature of an architect's service, that this should be so. It is not to be expected that a contractor will agree to satisfy two independent authorities in the execution of his work, or that a client can be allowed to delegate his authority, and then escape the responsibility for it. On the other hand it is reasonable that the architect in his turn should be held to a close accountability to his client, for the proper and skilful performance of his duties; and it will be to the detriment neither of the community nor of the profession, when this responsibility is more consistently enforced than it is among us.

THE Woodruff Scientific Expedition, of which we have received the final announcement, is so far organized that its starting is appointed for next October. A good steamer of fourteen hundred tons, the "City of Merida," formerly of the Alexandre line from New York to Havana and Mexico, has been chartered, and it is expected that Commander John W. Philip of the United States Navy will be detailed to take charge of her. She will be officered and manned like a vessel of the navy. The object of the expedition, as appears from the announcements, is to furnish an exemplary tour to such a class of students in science as may be attracted to it, and at the same time to accomplish as much scientific work as such a tour may give opportunity for. The guiding body of the expedition will be a faculty of scientific men, among whom are Prof. Wilder of Cornell for comparative anatomy, Prof. Smith of Yale for zoölogy, Prof. Herdman of the University of Michigan for physiology and anthropology, Prof. Farlow of Harvard for botany, Dr. Schaffter of Berne for history and geography, Prof. Jenney of the University of Michigan for art and archæology. The ship will be carefully fitted up with all appliances for the necessary scientific study, a library of scientific works for reference, books of travel, etc. Regular courses of lectures will be given when actual explorations are not in hand. The time allowed for the expedition is two years: the route is to be by way of the Bahamas to South America, stopping at the mouth of the Amazon, thence to round the continent by the Straits of Magellan and to Valparaiso, across the Pacific by Otaheite and the Feejee Islands to Formosa, Japan, China, and the Philippine Islands, through the Indian Archipelago and by Southern India to the Red Sea, stopping at many points to make observations and collect specimens, and through the Suez Canal into the Mediterranean. Egypt, Palestine, Greece, and Italy will be visited, and Spain and France will be touched on the way to England, whence the Expedition will sail for home.

THE main attention of the company, as may be supposed from its organization and route, will be given to study of the natural sciences; and the greatest expenditure of time is assigned to the more unfrequented places in and about the Pacific and Indian Oceans, where it is expected that collections of value may be made. It is intended, however, to take advantage of the opportunities which such a trip offers for the study of history, archæology, and art; and to secure, as far as may be, the information and enjoyment which are the usual objects of foreign travel. The families of some of the professors will go with them; and a variety of shore excursions are proposed in the various countries, especially of Europe, at which the ship will touch. The scheme gives evidence of careful study and intelligent planning, though we are led to suspect that the professor of archæology was absent when the prospectus was drawn, since we read in it that the ruins of Pæstum are among the grandest remains of Roman art. The different regions will be reached at favorable seasons, as far as the range and duration of the voyage will permit. The vessel is being fitted up for the purpose with care; and the preparations are apparently making in a very liberal manner. Of course this expedition cannot, in the nature of things, be a cheap pastime: it is rather an encouragement to see that the fee required from the student is five thousand dollars, though for those who are entered as "cadets," to take their part with the officers of the vessel, it is reduced to half that sum. It is perhaps sanguine to expect that much can be accomplished by such an expedition, under the constant necessity of "moving on," in the way of actual scientific work, except in collecting, under guidance of the professors, valuable specimens for subsequent study; or that any great progress can be made in such studies as archæology or any branch of art. But the students will have the advantage, of the utmost value to them, of seeing how the actual work of investigation is undertaken by experienced hands, and of being constantly in the atmosphere of it during their two years' voyage. In the matter of art, they will have an opportunity to get that kind of cultivation which comes of

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seeing, under intelligent guidance and with the stimulus of a common enthusiasm, what there is to study and how it ought to be studied. In fact, we should think that for those who wish for the advantage of a tour of study in the subjects which come within the scope of the expedition, here was an opportunity of unusual promise.

THE QUALIFICATION OF ARCHITECTS.

THERE ought to be some good lessons learned and some advantage wrested from the many disasters to buildings which have attracted public attention during the last two or three months. There has been general complaint enough of incapacity among architects to lead to some effort on the part of the public to compel proficiency if it lay in their power, one would think; and it ought to be enough to arouse among architects a serious desire to vindicate their profession from the rather wholesale reproaches that have been cast upon it. It would seem that for the sake of the public at least there was the same sort of need to protect their lives and property from danger of malpractice, though in a less degree, that there is to make themselves secure in the hands of physicians. The casualties that have occurred have come about through want of knowledge and training or want of care of architects, or of their subordinates, or of persons who ought to have been their subordinates. Inasmuch as good building can always be secured by going to work in the right way and by employing the right persons, it becomes to the public a matter of great importance to have some guaranty of proper qualifications in architects, and some way of discriminating between those who possess them and those who do not. To architects, on the other hand, it becomes important both that the claim of the instructed part of their profession to confidence should be recognized, and that there should be some better way than now exists of distinguishing between the instructed and the uninstructed. This leads directly to the question whether the architect's profession ought any more than the physician's or the lawyer's to be open to all comers; whether everybody who chooses to call himself an architect is to be accepted as such without distinction; or whether some test which the public can recognize should be set up to distinguish those who are to be accepted from those who are not.

Of the main facts that a great many persons assume a place in the profession who have no sort of proper training for it, and that there is no distinction whatever visible to the public between these and those who have given themselves every advantage of education, there can be no question. It is not so easy to say how such a distinction is to be marked, and to choose the best way of doing it. It would not be easy in any case to set up a high standard of attainment: it would however be reasonable to establish a minimum requisition, which should oblige every one who would claim to be a practising architect to at least put himself in the way of acquiring a fair knowledge of what an architect is called upon to do, and should exclude everybody who could not show that he had provided himself such opportunities.

We are not without precedents. In Prussia, for instance, whoever will undertake practice as an architect is obliged to go through a proper course of study, and pass an examination upon it: until this he is not allowed to practise. We do not know that any such condition is enforced in France, but the very strict responsibility for his work to which the laws hold an architect make it dangerous to him not to know his business. The fact that a great architectural school is maintained by the French Government, and that all the honors and most of the success of the profession fall to the graduates of this school, makes it the standard of training, and almost compels every architect to learn his profession there. So far as we know, M. Viollet-le-Duc is the only French architect of the day who has attained great distinction without having been a pupil of the *École des Beaux-Arts*. The existence of the school, if it does not exclude from the profession all but its own pupils, establishes a definite and universally recognized standard of training for it, and makes professional success impossible to those who fall greatly below it. In England there is no such provision as either the French or the Prussian. The numbers and prestige of the two great associations, the Royal Institute of British Architects and the Architectural Association, as well as of the provincial societies, tell in favor of professional acquirement there. The question of introducing an examination for a degree in architecture by the Institute has been brought up; but the proposition has been opposed on the ground that architecture is an art, and that therefore proficiency in it is not to be determined by an examination. This is true; but it does not cover the ground, at least from the point of view of the public, which demands, or should demand, a guaranty not so much of an architect's taste, talent, or artistic skill, which cannot be controlled, as of fitness for his practical work, which is the one part of his professional capability that can be provided to order.

The need is already supplied among us in other professions. Almost all religious denominations, for instance, require that their ministers shall be licensed before they allow them to assume charge of parishes or to preach. Lawyers are not allowed to practise in the courts till they have been admitted to their bar; and this is contingent on their passing some sort of examination, as the continuance of their membership is, theoretically at least, on their maintaining a certain degree of decency in their professional relations. In all civilized countries, physicians are obliged to provide themselves with a degree, or with a certificate of some kind, before they are allowed to practise, or, what is the same thing in intent, before they can lawfully collect their fees. In none of these professions is the required standard of acquirement a high one; nevertheless it is enough to oblige candidates to have at least undertaken a course of professional study, and put themselves in the way of learning their business. It is a public recognition of the fact that a certain professional training is necessary, and of the means by which it is to be acquired; and no one can doubt that in these professions, the restrictions, slight as they are, that are so put upon entrance to them, have an effect in keeping the average standard of knowledge and skill above what it would be without them. They give also, at least, a low-water mark, below which the public may know that that they ought not to go, and in most cases cannot, in their choice of a practitioner. Such restrictions redound to the public esteem of the professions which conform to them or enforce them, not merely from their appearing to serve as a guaranty of some sort of capability, but from the simple fact that they betoken a certain care in exclusion, just as the clubs in which it is known to be most difficult to acquire membership are most esteemed even by those who have not the smallest idea of belonging to them. The restrictions, too, react on the profession by encouraging a wholesome *esprit de corps*. This *esprit de corps* is one of the most efficient means of keeping the practitioners of any profession up to their best work, and is invaluable in securing the benefits of common action; but it is difficult to maintain mutual support, encouragement, or even recognition, among the *personnel* of a profession which is so unfenced that no one knows how or when its members get into it.

There are two ways of marking the line of entrance to a profession, both of which are found serviceable. One is the method adopted in this country by the bars of the various courts of voluntary association among their members, excluding or else marking by some unmistakable disability those who do not conform to its requisitions. The other is by statute law, requiring a degree, certificate, or license, and making this the condition of recognition in the courts. It is the palladium of the medical profession. The first means has the advantage of favoring more than the other a united professional spirit among the practitioners, the *esprit de corps* which we have commended; and may be more elastic, giving better opportunity to raise the standard of admission from time to time, in accordance with the general growth of technical acquirement. It has the disadvantage to the common eye of being in the direct interest of the profession only, and of only indirectly benefiting the public by giving them on the whole better lawyers, architects, or whatever it may be. It is therefore, when it is introduced as a novelty, less likely to commend itself to the common mind. Moreover in a profession as loosely strung as ours, there would probably be difficulty in uniting the members in the general effort necessary to make it succeed. It was adopted in the law at a time when people were more systematic, precise, and united in matters of polity than they are now and here. It was in fact a relic of the spirit of the mediæval guilds, a spirit which it would be a laborious undertaking to instil into our new and

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unorganized profession, as it would be difficult perhaps to do it without at first incurring reproach.

The second means has the advantage of appealing directly to the public interest, in that it is primarily a way of protecting the public against incapable practitioners; and it saves those who are established from the reproach of assuming to debar others from a position which they themselves have already secured. Such a distinction is perhaps more apparent than real; but it would undoubtedly have an influence on the popularity or unpopularity of the movement, and also on the spirit in which it was undertaken or opposed. The natural means of enforcing such restrictions as it might be thought well to impose would be that which holds with physicians, — incompetence of the disqualified to collect their fees or sue before the courts. The qualifications which naturally suggest themselves are technical examinations and the certificate of a proper course of study. The first is the most satisfactory when it can be properly enforced, as it is in some countries; and it is practicable and decisive in the matter of technical acquirement as it is not in that of fitness for civil appointments. Examinations are unpopular, however, and the position of examiners is more or less odious; while some degree or other certificate of acquirement from a recognized authority is as inoffensive a condition as could well be annexed to the practice of any lawfully regulated calling. It might, therefore, be found easier to secure acceptance for a system of which examination was not a part, or in which it was only an alternative.

The fact that jurisprudence is the concern of individual States makes it natural and easy that any such provisions should be set on foot at first as a local experiment. The great trusts, public and private, that are put into the hands of architects, the warnings we have lately had how much the security of life depends on the skill and faithfulness with which their duty is performed, are proof enough of the concern that the public has in their competency. It would be quite in character for the Legislature of Indiana, which has just prescribed such a heavy burden for the architects whom it invites to compete for the design of its State Capitol, to take some means for the purification of the profession which it handles so roughly. But it would be preferable that some State in which the profession is better organized than it is in Indiana should set the example. If, for instance, New York or Massachusetts should pass a good law regulating the practice of architecture, it would be doing good service and setting a wholesome example. Such a law might provide that from its going into effect no one should be legally recognized as an architect or entitled to collect his fees who should attempt to practise without a license or commission; that such license or commission should be granted only to architects who could prove themselves to have been established in practice before the taking effect of the law, or to those who should pass a satisfactory technical examination before some stated tribunal, or who should show by the degree or certificate of some duly recognized authority that they had pursued a sufficient and recognized course of professional study. It would be a matter of some care and consideration to adjust satisfactorily the details of the scheme, but there would be no insurmountable difficulty in making it practicable and reasonably efficient. Every legal restriction of whatever kind finds its opponents. Builders who wished an easy transition from the bench or the trowel to the architect's desk might resist this; but it is not easy to see from whom else any very strong opposition should come. To an enlightened public opinion it should present itself as a safeguard, while architects ought to welcome it as a permanent help to the standing of their profession, which should offset the trifling inconvenience of licensing or enrolling themselves. We earnestly commend the consideration of this topic to our fellow-architects, and shall be glad to hear what suggestions they may have to make with regard to it. It is quite time that something was done to show publicly what is an architect and what is not. The public has been awakened to the importance of proper knowledge among architects. Those of them who wish to raise their profession in proficiency or in influence will see that here is an opportunity which ought not to be neglected. Any movement to establish a legal definition of it will come much more gracefully from architects themselves, than from a legislature animated by the spirit of that of Indiana.

NEW BOOKS.

SANITARY ENGINEERING.[1]

IT is not many years since the title "sanitary engineer" attracted the same sort of questioning comment with which at about the same period the title "landscape architect," and earlier the title "consulting engineer," were received by regular practitioners. Thirty years ago the engineering of sewerage was regarded as a matter of rather slight importance, and it had failed to gain any considerable special attention.

At about the time when the construction of the main intercepting sewers of London and the delivery of the city sewage some miles down the Thames were first contemplated, there were published by the English Government a number of "Blue Books" giving a very thorough, and for that period a very exhaustive, consideration to matters relating to sewerage and house drainage. Subsequent inquiries into the causation of zymotic diseases have engaged the attention of many able investigators; and the whole subject has been taken up by philanthropic philosophers and writers until little by little the science of sanitary engineering has attained a position in which its importance is recognized in and out of the profession.

Mr. Bailey Denton's book is the most important, as it is the latest publication on the subject. It is a ponderous octavo volume of four hundred pages, quite doubled in size by numerous plates showing the details of construction of all manner of sanitary works. Being the work of a single engineer, it is of course very largely the exposition of the theories and practice of an individual, and it has the limitations which attach to all individual performances. But it has also the great merit which comes especially of the persistent study and careful consideration of a man of more than ordinary intelligence, who has reached the highest position in his profession. It is in our opinion the most complete and satisfactory treatise that has yet appeared on this subject, and the most valuable single work to which an architect, a physician, or an engineer may appeal for practical information.

We propose to devote more than one paper to its consideration, for it covers a range of subjects to which no adequate reference can be made in a short review. It is divided into five sections: Air; Water; the Dwelling; the Town and Village; and the Treatment and Disposal of Sewage. The first section relates especially to the pollution of air by animal life, and by the decomposition of organic matter, with reference to the value of the percentage of carbonic acid as an index to its degree of contamination; and to the action of ozone as an agent of purification. Dr. Cornelius Fox's sources of ozone are stated to be, "the oxidation of metals, the decomposition of rocks, the germination of seeds, the growth of plants, the falling of dew, rain, hail, and snow; the collision of air-currents of different degrees of humidity, proceeding from opposite quarters, with one another or with the earth; the evaporation which is continually proceeding from saline fluids, such as oceans, seas, and lakes; the dashing and splashing, the smashing and crashing, of the restless waves on the rocky coast."

On the subject of "ground-air" much importance is given to the investigation of Prof. Ripley Nicholls of the Massachusetts Institute of Technology, covering the important fact that although soil surcharged with foul matters contains an important amount of dangerous gases, the diffusion of these gases in the atmosphere is so active that a few feet from the surface of the ground no excess of carbonic acid could be detected.

The production of *malaria* in soils not polluted by domestic life is closely connected with undue soil-moisture. This was especially noticeable in Mr. Denton's examinations of the seacoast marshes between Civita Vecchia and Pæstum, where the water stands within a short distance of the surface, and where the amount of organic matter is very large.

The duty of the engineer in relation to air is imperative in the direction of rendering the ground upon which dwellings are to stand sufficiently dry by artificial drainage, — that is, "free from subsoil water to within a recognized depth of their foundations." The absence of under-drainage is the primary cause of evil, while a soil aërated by under-drainage would to a certain extent oxidize the organic matters it contains, and greatly prevent the generation of miasma.

Referring to the accidental circumstance that sewers as they are often constructed serve as underdrains, it is stated that they should by no means be built with reference to this fact, for the reason that while subsoil water flows into them and is removed by them when this water stands at a sufficient height in the grounds, when the water recedes in time of drought the reverse action takes place, and the foul liquids of the sewer leak out into the earth.

Our author's statements have a bearing upon a discussion published some months since in these columns. It is asserted that "soil when drained and aërated has an almost immeasurable power of cleansing any fluid that may enter and pass through it, and thus defective work may be rendered harmless."

By reason of our nationality, we may be excused for referring to the fact that Mr. Denton, like most English writers, fails to give

[1] Sanitary Engineering: a series of lectures delivered before the School of Military Engineering, at Chatham, Eng., by J. Bailey Denton, F. G. S. M. Inst. C. E., etc. E. and F. N. Spon, London and New York.

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to Dr. Bowditch of Boston the full measure of credit that seems his due for the suggestion, now almost universally adopted by sanitarians, — that soil-moisture bears a very important relation to the propagation of consumption. English experience and observation seem fully to sustain this theory, but they only sustain it. All that they have proved or suggested seems to have been covered by Bowditch's original publication. It has long been understood that protection from fever and ague is influenced by the decomposition of organic matter in the presence of excessive moisture, or by the exposure of organic matter recently submerged. Mr. Denton says: "From the Fens, ague, which has been the rule in every family during the spring of the year, has now been almost entirely banished by the works of Rennie and other engineers; although since it first ceased to exist the disease has recurred, not at the same period of the year (spring) as before, but, as I am informed by Mr. William Marshall of Ely (the accuracy of whose observations as a naturalist is well known), in the autumn of the year, — a special circumstance, which he says has been explained by the fact that 'the drainage has been carried beyond the point of prudence, so that in the summer months and especially towards harvest, the Fen ditches became nearly dry, and the consequence was that we once more got an exhaling surface, and a noxious effluvium arising from decaying vegetable matter.'" Mr. Marshall in further explanation adds that "this state of things is now quite altered, and the ague has again vanished, owing to the farmers making it a rule to let water in from the rivers during the summer months, so as to 'keep a water' always in the fen ditches."

Aside from the influence of soil drainage upon the production of malaria, its influence upon temperature is hardly less marked. Buchan's experiments showed that in Scotland the under-drainage of agricultural lands produced an advantage in temperature equal to a removal of a hundred to a hundred and fifty miles southward.

From the last division of the section on Air we quote the following: —

"The maintenance of pure air by the under-drainage of the soil surrounding and beneath dwellings is an object only inferior in importance to the removal of putrescible matters. That this object is one of the most important that can engage the attention of the sanitary engineer, cannot be denied when it is shown on the authority of Dr. de Chaumont that long-continued exposure to bad air tends to the production of scrofula and consumption — of which latter disease it is, as already stated, probably the most efficient cause; that it promotes enteric fevers; that it fosters ailments of the respiratory organs, such as catarrh, bronchitis, and pneumonia; that it is frequently the cause of inflammation of the eyes; and that it adds to the spread of small-pox, measles, scarlet fever, and the like, while it renders the rapid cure of wounds and all sores a work of great difficulty."

AN ARCHITECT'S LETTER ABOUT SEWER-GAS AND HOUSE-DRAINAGE.

This is a small pamphlet containing a letter of advice with illustrations, written by Henry Masters, Park Street, Bristol, Eng., to a client in whose house there had occurred a death from an illness that was supposed to have been caused by the admission of sewer-gas. It describes very well a system of soil-pipe and drain ventilation, such as is quite generally recommended in England by architects and by sanitarians, who confine their attention to the drainage work of the house, but who seem to us to pay too little regard to the condition of the air in the sewer in the street. Considering the writer's standpoint, the case is well stated, and the directions are explicit; but the whole tendency of these gentlemen is in the wrong direction.

Almost without exception, they make a great point of so separating the soil-pipe from the street sewer, that there is no possibility of the ventilation of the latter by what is generally considered to be the most efficient means.

There is no better way to secure the community from sewer-gas, than to ventilate the sewer itself; and there is no more effective way for securing the ventilation of the sewer than by using every soil-pipe and house-drain connected with it as a channel for the withdrawal of its air. Were this imperatively demanded by municipal authority, not only should we secure the best ventilation of the sewer, but the sewer would become the best source from which to draw a supply of air for the ventilation of the soil-pipe.

The idea that there is danger of a leakage of sewer air in the house, if this system is adopted, is certainly erroneous. A cast-iron soil-pipe with well secured lead joints passing through the house from the cellar to a suitable point above the roof, provided at this point with a ventilating cowl, need under no circumstances lead to the entrance of sewer air. It is only a question of proper construction, in a matter where proper construction is perfectly easy.

PROTECTION FOR PENCIL-SKETCHES. — To protect delicate drawings in pencil or chalk, such as are easily smudged if roughly handled, and to give them more permanence and solidity, coat them with ordinary collodion, sold by all dealers in photographic materials. The same may, if desired, be used with an admixture of porriff in stearine or castor oil, and affords a coating. Pencil-sketches are in this way rendered clearer, and may therefore be copied the more easily.

THE ILLUSTRATIONS.

COMPETITIVE DESIGN FOR FIRST CONGREGATIONAL CHURCH AT NORTHAMPTON, MASS. MR. H. F. KILBURN, ARCHITECT.

(Broadway, New York, N.Y.)

THIS design was selected several months ago from about twenty-five, by a committee, and afterwards adopted by the parish; but owing to the subsequent preference of the building committee for a different design it was not carried out. It has a seating capacity for twelve hundred, with lecture-room, Sunday-school room, library, parlor, etc., in the basement. It was to be built of Monson granite, with white ash for interior wood-work. A responsible builder offered, in writing, to build it in this manner for $50,000.

COTTAGE IN WEST VIRGINIA. MR. F. A. WRIGHT, ARCHITECT.

(Cornell University, Ithaca, N.Y.)

As may be seen, the first story is of brick, and all above is of wood. Black and yellow bricks are introduced to add variety, and in general take the place of stone, which is sparingly used. A panel in the chimney has an initial and date, in tile-work. The outside wood-work is painted in two colors. The iron-work, consisting of the cresting and finials, is also in two colors. The inside finish is of hard wood, oiled, except the kitchen and attic, which are of pine, shellacked. The dining-room, parlor, and hall have hard wood floors, with black walnut borders. The dining-room ceiling is of wood, in narrow strips laid diagonally. There is a plain wainscoting in the hall and dining-room. The cornices are of wood, as also are the two mantels. The bay-window opening in the parlor is square-headed, the architrave running around with brackets inserted in the angles. This house was erected last summer, at an estimated cost of about $4,000.

HOUSE FOR A. S. HILL, ESQ., CAMBRIDGE, MASS. MESSRS. WARE AND VAN BRUNT, ARCHITECTS.

(2 Pemberton Square, Boston, Mass.)

SCHOOLHOUSE AT PROVIDENCE, R.I. MESSRS. WALKER AND GOULD, ARCHITECTS.

(Providence, R.I.)

CHAPEL FOR THE SECOND PRESBYTERIAN CHURCH, MANTUA, PENN. MR. D. E. SUPPLEE, ARCHITECT.

(208 South 4th St., Philadelphia, Penn.)

AMERICAN INSTITUTE OF ARCHITECTS.

BOARD OF TRUSTEES.

AT the regular monthly meeting held at the rooms of the Institute on Thursday, April 5, 1877, a communication received from the "*Société Centrale des Architectes*" of Paris, dated March 3, 1877, inviting a delegate to be sent to a congress of that society to be held in the *Ecole des Beaux-Arts* between the 11th and 16th of next June, was referred to the Secretary for Foreign Correspondence.

The Secretary said he had recently seen for sale at Sypher's, price $60, a perspective drawing of the original Capitol at Washington, purporting to be the work of Latrobe, and presented by him to Thomas Jefferson. The Secretary called attention to the action of the last convention in relation to a set of Latrobe's drawings offered to the Institute by his son, and moved that a correspondence be opened on the subject. Carried. . . .

Mr. Haight moved that the Rev. William A. McVicar be elected a corresponding member. Carried.

The meeting then adjourned.

At an adjourned monthly meeting held at the Institute rooms on Thursday, May 10, 1877, the Secretary presented a letter from John Moser, Toledo, O., April 20, 1877, with application for a Fellowship, dated Feb. 8, 1877, indorsed by Levi T. Scofield and Walter Blythe of Cleveland, and statement of his professional education; also specifications, photographs, and other illustrations of his work. After a survey of his credentials the Secretary was instructed to send out the circular of inquiry to Fellows with Mr. Moser's name. . . .

At the regular quarterly meeting held at the rooms of the Institute, on Thursday, June 7, 1877, the Secretary presented a communication from Mr. J. W. Moulton, architect, of New Haven, Conn., dated May 18, 1877, in relation to organizing a Chapter. The Secretary was desired to correspond with Mr. Moulton.

Also a letter from Prof. E. D. Lindsey, Curator of Grounds and Buildings of Princeton College, dated June 3, 1877, asking to consult next fall with the Institute "as to the *degree* which ought to be assigned — *if any* — to the graduates of (his) classes in architecture." The Secretary was desired to tell him that the Trustees will be glad to confer with him on the subject.

Also a letter from Mr. John Eaton, Commissioner of the United States Bureau of Education, Washington, D.C., dated May 4, 1877, making inquiries as to the library of the Institute.

Also a printed form of contract adopted by the Rhode Island Chapter and forwarded by that Chapter. A vote of thanks was tendered to the Rhode Island Chapter therefor. . . .

The meeting then adjourned.

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CORRESPONDENCE.

THE STEWART MEMORIAL CHURCH. — THE ASTOR REREDOS. — NEW BUILDINGS. — A PROPOSED MUSEUM OF SCIENTIFIC INDUSTRY.

NEW YORK.

THE Stewart Memorial Church at Garden City, L.I., has received considerable attention during the past week in the public notices and reports of the ceremonies connected with the laying of the corner-stone. The discussion upon the merits and demerits of the design has already begun; and while the general public look at the pretty pictures which Judge Hilton has had prepared, and the exaggerated bill of costs which has been so industriously circulated, and cry, "Beautiful! charming!" the few architects who have seen it, and the many more who have heard of it, shrug their shoulders, and mutter significantly about another of Stewart's building blunders. And it certainly does seem that the fatality which marked every attempt of A. T. Stewart in the way of building, is to be repeated here in this erection over the remains of the dead millionnaire. The religious rejoicings over the corner-stone laying drew a crowd of nearly ten thousand people, and of course the joy over such an endowment as this cathedral ran very high in the ranks of the clergy and church people; and it would have been a subject for real congratulation, had a broader notion of what the future of his work would demand occurred to the architect when laying the first lines of his design. His work is a cathedral only in name: really it is but a chapel; and if in place of carved slabs and other showy work, an attempt had been made to expend the money on a building combining massive treatment with a beauty of mass and outline, it would have given opportunity for further work and drawn praise where now, at best, but a qualified approval can be vouchsafed.

The private view of the Astor reredos in Trinity Church, on the 27th ult., was an occasion of which any architect might feel proud. Divines and literary men, journalists, critics, and fellow-architects, with a liberal sprinkling of the best class of general society, thronged the church for several hours, dividing their time between feasting their eyes upon the beautiful work and heaping congratulations upon Mr. Withers. There was criticism, but even the severest critic, who thought the sky-line in this, a Gothic piece of work, was not sufficiently marked, modified his severity when he remembered the circumstances under which the work was done, with a great colored chancel at the back, and without the opportunity of setting the work out some feet, and getting that relief which it now lacks. One thought that more prominence might have been given this new work, even at the expense of the church's interior; but this was a point which Mr. Withers specially strove to avoid, and the criticism was therefore eminently unjust. The execution is magnificent as a specimen of workmanship; almost too good, leading one to feel like tasting it, as a richly ornamented bit of confectionery. At the dedication ceremonies on Friday, St. Peter's Day, Dr. Morgan Dix, the rector, paid a high compliment to Mr. Withers, saying, —

"In the architect we have had one who fears God and loves the Church; whose whole heart has been in this thing; who has a devout religious purpose in it all. Nay, he did more; he has infused his own spirit into the artisans, both here and in England. On both sides of the Atlantic men of the first ability have been at work with pencil and chisel, each band filled with an honorable ambition to make their part the best; so that really much of the spirit of the old craftsmen has gone into this labor, and now lives under yon sculpture."

To visit New York and fail of seeing the Trinity reredos, would now be a *faux pas*.

But to speak of coming things. Union Square is to have another iron box, similar to that in which Tiffany & Co. store their valuable goods, and adjoining to it. The old Spingler House is falling beneath the wreckers' crowbar; and soon this reminder of old New York, by which we mean the metropolis of twenty-five or thirty years ago, will be no more. It was once, as the Spingler Institute, a young ladies' seminary of no small repute; and there are thousands in society to-day, who acquired their accomplishments in this school, then on the outskirts of the town. The owner, Col. M. M. Van Buren, has determined on one of the usual iron-front, brick-back, wooden floored, many-storied, cheap, and showy fire-boxes, of which our city has too many now. The frontage is 77 feet 6 inches, and depth 110 feet, in one mass 5 stories high, of no particular architectural merit. An L in the rear is 26 feet x 49 feet, making total depth 159 feet. The cost will reach $110,000. The height to the top of the sheet-iron balustrade over the sheet-iron cornice will be 98 feet. Within there are merely loft floors carried on iron pillars.

The Jauncey Court work is getting on with the care and deliberation befitting the expenditure of a quarter of a million. The two designs are as various as can well be, as far apart as Gaul from Briton; Mr. Clinton giving a labored work in Victorian Gothic, and Mr. Alfred H. Thorp a startling design in Parisian style. It will be the very proper English dame with all the paraphernalia of her station, beside the dashing lady of the *demi-monde* arrayed for a drive in the Bois. From top to bottom Mr. Thorp's building will show only dazzling white marble. The building covers an area of 80′ 0″ x 65′ 6″, with a rear wing 22′ 6″ x 56′ 4″. The construction is fire-proof throughout, with iron beams and P. B. Wight's patent columns. Hall-ways and stair-treads with marble tiling, and marble-panelled wainscoting. The front is a pier and lintel construction, with high basement, and five stories and attic. From the fifth story 72 feet above the curb-line, a marble balcony with bronze rail will project. The roof will have dormer windows; not very visible, however, from the street. To the top of cornice-line the height is 84 feet. A peculiarity of the plan, and one which will find favor, is the setting of the entrance-hall floor at an intermediate level between the basement and first floor. The basement is 12 feet, and the first story 17 feet high, a total of 29 feet. The hall floor is set 8 feet above the basement level: then, with a height of 12 feet in hall, a mezzanine floor of 9 feet is left overlooking the main floor; a railing along this, and a short stairway to reach it, will give greatly increased accommodation, while the basement will extend across under the hall as before; a spur in the hall and a few steps will give access to the first floor. The elevator is carried up in the stair-well, while the several window-heads, over the French sashes, will be filled in with cathedral white glass set in lead; the object being to secure form rather than color effect. How the two buildings will look together, it is difficult to say: the polychrome of one will certainly have an effect upon the monochrome of the other, and *vice versa;* though which will suffer, if either, we must wait and see.

The latest thing is the proposition of Vaux and Radford to demolish the useless distributing reservoir on Fifth Avenue, and occupy its place by a Metropolitan Museum of Scientific Industry, something similar to the permanent exhibition now occupying the Centennial Main Building in Fairmount Park, Philadelphia. Messrs. Vaux and Radford have addressed a letter to the mayor suggesting a design, which is certainly a novel one. It proposes a hall or pavilion 390 feet square, covered by an arched roof 135 feet high from floor to ceiling, resting on outer walls and converging to a central shaft or column; second, a corridor with gallery over, surrounding the hall. The total floor-space thus given will be about five and a half acres. The central shaft will contain stairs and lifts, giving access interiorly to a balcony under the ceiling, and exteriorly to a platform 100 feet square, and 175 feet from the floor level, which is intended as an outlook and open-air refreshment-room. Provision is made for an orchestra at the base of the vertical shaft; and a portion of the floor is furnished with seats for the audience. Communication will be made with the park on the west side, with suitable approaches, etc. By the mode of construction and arrangement proposed for lighting and ventilation, it is believed that the inconvenience arising from the glare and heat of the sun will be much less than is usually experienced in buildings erected for purposes of an analogous character. Full provision for heating and for the accommodation and convenience of visitors has been made; and from the result of a careful estimate, based on present prices, and assuming that the site is cleared to the level of Fifth Avenue, it appears that such a building could be erected in a substantial and complete manner for $850,000, exclusive of terraces and work on park approaches.

The demolition of the present mass of reservoir masonry covering a space 400 feet square will be an enormous task; and altogether it is better to allow the present black elephant to rest on our municipal hands than spend time and money in substituting for it a white elephant, about equally useful or useless.

THE CHOIR STALLS OF CANTERBURY CATHEDRAL.

THE Rev. W. J. Loftie, F.S.A., Member of Council, Royal Archæological Institute, writes: "We hear a good deal of a new Society for the Suppression or Discouragement of Restoration. What are its members about? Some of your readers may not be aware that owing to successive repairs and alterations, there is very little left of the structure of Canterbury Cathedral older than the present reign. But among the few genuine relics of antiquity must be reckoned the choir-stalls, which are good examples of the delicate carved work of the age which produced Grinling Gibbons. It is proposed to remove them as incongruous, and supply their place with modern work in imitation of some fragments of a stone screen of the fourteenth century. The ancient stalls are, we are told, to be placed elsewhere; but elsewhere will not be in the choir for which they were made, where they look beautiful, and where they are no more incongruous than any of the other Romanesque work in which the cathedral abounds. There is no reason for removing these picturesque and interesting remains which does not apply equally against all the Norman work. It is true the Chapter in 1840 removed the Norman tower, and replaced it with a perpendicular imitation; but this is hardly a precedent to copy. Let me humbly warn intending subscribers of what they are doing."

In reply to this, Mr. Beresford Hope writes: "I observe that my friend Mr. Loftie has written to you in opposition to Sir Gilbert Scott's scheme for reinstating the choir of Canterbury Cathedral, and at the same time for removing the actual western stalls of Queen Anne's date to some position in which their delicate workmanship shall be visible, as at present it is not, owing to inevitable deficiency of light. A few words will be enough to show that Mr. Loftie's apprehensions verify the wise man's description of fear, as 'the betrayal of the succors which reason offers.' The 'unusual

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destructiveness' is this: The choir of Canterbury differed from other mediæval minsters in never possessing a richly-carved series of wooden canopies ranging over its stalls; but it does still possess a notable portion of that which was the substitute in its north and south enclosure, viz., a peculiarly beautiful stone screen of the finest period of the middle pointed style, constructed by and called after Prior Eastry. This composition had been originally re-turned round the west end of the choir so as to form the inner face of the 'jube,' or choir screen; but whether or not any sufficient portion of this part of the work still survived was not known, blocked as the space was by these very beautiful stalls of the Gibbons style. Recent investigations, however, revealed the fact that enough of this, the richest feature of Eastry's choir enclosure, was in existence to admit of its being perfectly reinstated, if only the aforesaid stalls did not pre-occupy the ground. Assuming that, in spite of their incongruity of style, they were so sacred and so beautiful as to forbid their removal, of course all hope would have had to be abandoned of ever reinstating the composition of Eastry, and thus of re-creating in Canterbury Cathedral an example — unique, at all events in England — of an internal choir enclosure of the purest days of Gothic designed in stone, and not in wood. The beauty of these more recent stalls was simply that of their own details. They unriddled no problem of archæology or art; they had no correspondence with the surrounding structure. That which they could most rightly claim was that they should stand in some position in which the minute finish of their delicate workmanship could be appreciated, as is emphatically not the case where they are placed. Under these circumstances the authorities of Canterbury Cathedral, acting by the advice of Sir Gilbert Scott, have decided to remove the stalls to some better light, and at the same time to reinstate Eastry's enclosure, and thus make Canterbury Cathedral rich by two, and not by one only, monuments of art; and for this they are taxed with 'unusual destructiveness,' and the public warned of helping them."

ARCHITECTURAL RESTORATION: ITS PRINCIPLES AND PRACTICE.

[From a paper read by Mr. J. J. Stevenson before the Royal Institute of British Architects.]

FOR many years I have felt that restorations, as usually conducted, were a mistake; that they were destroying the old art, and obliterating the history of the country. But it seemed useless to say any thing, and the few whom I knew to hold similar views were equally hopeless. The mass of the architectural profession was against us; the clergy, who had the chief say with regard to churches, the most numerous and important of our old buildings, considered it a duty to art and to religion to restore them, giving liberally their exertions and their money, and exhorting all whom they could influence to aid in the good work. The tide in favor of restoration was so strong that it seemed hopeless to oppose it, — the only result injuring one's self and offending friends; for it was useless to speak without giving examples of the harm and destruction we believed were being done. Yet we are bound to face even these risks, if we are right in thinking that irremediable harm is being done to the old art-records of the country. I am sure that those whose system of restoration I am attempting to prove wrong will acquit me of any personal motive in expressing my opinion.

I take a paper of advice to the promoters of restorations, issued by the Institute of British Architects, as a fair exponent of the present system. It is entitled "Conservation of Ancient Monuments." It seems to me to consist mainly of recommendations for their destruction. This paper bears date March, 1865. It was, I believe, the result of an admirable address on the evils of restoration, read by Sir Gilbert Scott to this Institute in 1862. It is difficult, after reading this address, to believe that any more old churches would be destroyed by restoration. Yet the process has been going steadily on, approved by clergy and architects, the press and the public, as holy work. But the dissatisfaction with the restorations of the last thirty years has been more wide-spread than we thought. Since I undertook to read this paper, a society has been formed which includes names prominent in the church, in literature, and in art, with the view of opposing the present system, convincing the public of the error of it, and trying to save what of our historical buildings yet remain untouched and untampered with.

An old church which has not been restored is an absolutely trustworthy historical document, a continuous record of English history. Thirty years ago England was full of such old churches. A few are left, but to our children they will be absolutely unknown. Unless the fashion changes, every one will have been restored. The ignorant and foolish destruction of historical records which restoration too often perpetrates is noticed even by those who are in favor of restoration.

The Institute paper says:—

"It cannot be too strongly insisted on, that in dealing with an ancient church or other building the object should be not simply to put it in good repair, but to preserve it as an authentic specimen of the ancient art of our country. Every old building has an historical value, and it should be remembered that this is gone when its authenticity is destroyed. It must be remembered that new work is of no value or interest, excepting so far as it serves to preserve the ancient design, and that no interest will ever be attached to it unless original parts remain to attest its authenticity."

Good as the advice in this paper is, so far as it goes, I venture to assert that it is wholly inadequate, even if followed (and unhappily it has not been followed), to save our ancient monuments from being destroyed by restoration; that, keeping within the four corners of its advice, almost any amount of tampering with old buildings, and their destruction as historical records, is possible; and further, that the paper encourages and advises such tampering and destruction: for in the first place there is implied in it throughout, underlying every sentence of its advice, the view which seems held by all restorers, from the most eminent, learned, and conservative, to the most ignorant and destructive, — that the Reformation was a mistake, that since then the Church of England has no history worth recording, and that the historical monuments and the ecclesiastical arrangements of these three centuries of darkness and degradation ought to be destroyed. This, we know, has been the almost universal practice in restorations. In accordance with it, much costly work — the best which its age could produce — has been removed or destroyed; and more is threatened by those who, while destroying it, proclaim their conservatism, and declare that their object is to preserve historical records. It is proposed, for instance, to remove the rich carved oak screen which separates the choir from the nave in Canterbury Cathedral. Unless on the idea that the monuments of the Church of England since the Reformation have no historical value, the removal of this screen flatly contradicts the Institute's "Advice."

"A vigilant guard should be kept against the indulgence of individual fancies for or against particular features or styles, and especially against the theory that a restored church must be purged of all features subsequent to some favorite period. All such notions are in the highest degree dangerous, and have rendered many a restored church actually worthless as an historical monument."

Some restorers include in the modern work which it is their duty to destroy, any additions or alterations in the Perpendicular style to the original design of the building.

In Durham Cathedral the plain round Norman windows of the aisles were once filled with the most delicate Perpendicular tracery. It was obvious to the meanest capacity that this was not part of the original design. What the meanest capacity could not see, however, was how the division of the tracery increased the appearance of size in the church; how its delicacy brought out by contrast the massive grandeur of the piers. So, in the continual tinkering to which that unfortunate cathedral has been subjected, this tracery was cleared away. The windows now with their mean stained glass look dull and poor.

At Chester Cathedral, Sir Gilbert Scott removed the Perpendicular chapel which stood against the south wall of the lady-chapel. Instead of it he erected at the end of the south aisle an apse, of the foundations of which he had found traces, with the curious form of roof consisting of half a cone found in some old Norman churches, but not, so far as I am aware, in England.

The Institute paper advises the destruction of Perpendicular work, stating that "one main object in all church restorations should be to get rid of modern additions put up without regard to architectural propriety." Among these it includes the flat roofs of Perpendicular times; saying that though these are by no means always to be condemned, the new roof should be made of the same steep pitch as the original roof. This implies that flat roofs are generally to be condemned; and such is the practice of the best restorers. Mr. Street has done this in several churches; Sir Gilbert Scott replaced the old flat roof of the Venerable Bede's Church at Jarrow by a steep one. The result is, that the tower looks low, and is hardly noticed from a distance. Formerly, standing clear from the flat roofs, it was most conspicuous, and had a remarkable appearance of height, and held its own even among the factory chimneys which surround it.

But even if Perpendicular work is bad, we have no right to destroy it. It is the specially English architecture. It grew up as the people threw off foreign influences, Norman and Angevin, and asserted their English individuality. I have to confess that I like it; that I do not understand the dislike which many architects have to it.

While restorers have shown no scruples in destroying Perpendicular and Renaissance work, they have generally professed to treat work of earlier date with respect. But no period is safe from them. At Canterbury Cathedral one of the western towers was Norman. The authorities thought the two towers should be of the same design: so they pulled down the Norman tower, thus destroying the evidence it gave of the length of the original Norman church, and built a copy of the later tower, which they scraped and altered to look like the new one, so that the symmetry might be perfect.

The great tower of St. Alban's was covered at the time it was built with smooth plaster, which remained almost complete till the late restoration. One of the monks records with admiration that the building looked like a single stone. The monk's taste may have been defective. Sir Edmund Beckett, though he disapproves of removing plaster, thinks the tower does not look ill, as it is redeemed by the large quantity of dark cement used in the late restoration. He has a right to that opinion. But this plaster covering was historical, and no one has a right to destroy his-

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torical documents. To remove it was to tear a page out of the records of English history.

I have never been able to understand the curious delusion which possesses many modern architects, that plastered surfaces on walls are inconsistent with the Gothic style. In new buildings they are welcome of course to carry out the idea, and to show brick lining inside their houses, if their employers will let them; but they have no right to remove as they do the ancient plaster from mediæval buildings. Yet the Institute paper advises this course.

The mess which has been made in many old churches by restoring away the ancient plaster is really shameful. Mr. Street stripped the walls of the nave of Burford Church, and left the rubble pointed. We all know from the admirable illustrations of Bowman & Crowther the beautiful church of Heckington in Lincolnshire, which was a perfect example of the exquisite delicacy of the Middle Pointed style. The restorer has shown his appreciation of it by clearing the plaster from the inside, leaving the coarse rubble-work, as the Institute recommends, exposed to view, and pointing it all over with wide black joints. The ugly network is the only thing one can see in the church. One would think that to perpetrate this must have required the ignorance of a builder, joined to the self-conceit of an architect.

But there is high authority for this treatment. M. Viollet-le-Duc did the same to Notre Dame at Paris, where, however, the effect is not quite so atrocious, as the stones are squared, and the dark network consequently more regular.

Judging from their practice, one of the most remarkable characteristics of some restorers is their incapacity to see the marvellous color which time gives to buildings, and their want of appreciation of the interest and dignity which is given them by the marks of age. They like to scrape every thing clean, and as the specifications say, to "leave all perfect." In so doing they neglect the Institute's "Advice," which says that "in the restoration of decayed stone-work no scraping or tooling of the surface of the stone should take place under any circumstances."

Of all restorations, the most thoroughly destructive are those which attempt to restore the colored decorations in the interior of old buildings.

The pity is, that once the buildings are recolored, the record of what they once were is completely and forever destroyed. The whitewash did not destroy it, but rather preserved it. The modern decorator seems to think that one blue or green is as good as another.

It may perhaps be asked, What should be done as regards the restoration of ancient buildings? Is it too much to suggest that we should leave them alone; keep them in repair; keep out the wet; piece the roofs where needed; mend them with lead, and not with the botcher's companion — Portland cement? If the walls are sinking, underpin them. If they are bulging, build a buttress or tie them in. Surely our building and engineering science is capable of so much. Such repairs will not destroy the record, as pulling them down and rebuilding, and making them as we believe they were at first, must always do. Do not destroy the evidence of age, for it is this which gives the buildings their value.

Above all things, save the few churches which are still untouched from thorough restoration by an architect. For it is the knowledge and skill of the architect, which destroy the authenticity of the building as a record of the past. He is by profession a clever forger of old documents. He is trained to the tricks of the trade. As the forger selects paper like the old for his false documents, so the architect is taught in renewing an old church always to use stone of similar character to the old, so as to make his false work indistinguishable from the genuine. In a restored church we can never tell whether the new windows we see are old ones renewed, or the product only of the architect's imagination; and thus doubt is cast on the authenticity of every part of the building. This is why our alterations are deceptive, while former ones, each in the style of the time, were not so. We have no style: we forge only old ones.

NOTES AND CLIPPINGS.

THE LOUVRE. — The work of restoring the Louvre is going on satisfactorily. The two wings of the edifice are already finished. In front of it the laborers are erecting an enormous scaffolding in order that artists may ornament the principal façade by executing anew Lemot's bas-relief representing the bust of Louis XIV. placed on a pedestal by Minerva, in the presence of the Muses, Cupids, and other mythological figures. Above the grand entrance to the Louvre there will be placed another large bas-relief sculptured by Cartellier, and representing Fame in a car drawn by genii, distributing crowns.

A PARISIAN FIND. — An interesting discovery has lately been made at Montrouge, Paris, where in an uncultivated field was unearthed a group in granite consisting of a woman with a Medusa head, and a body finishing in a serpent's tail, who is trampled upon by a rearing horse whose rider at the same instant transfixes the monster with his javelin. Underneath the group was found an oaken chest in which was a cinerary urn, while close at hand were the remains of four columns, some medals, a few lamps, and some ancient bricks. Unfortunately the group was seriously damaged, while the urn and a parchment it contained have disappeared, so that there is now no clew as to what the statue is or where it came from.

A NEW PHILADELPHIA CHURCH. — On the 24th ult. was laid the corner-stone of the new Central Presbyterian Church, Messrs. Collins and Autenreith, architects. The dimensions of the new church-lot are 100 feet front on Broad Street by 146 feet in depth. Of this the church proper will occupy a space 80 by 75 feet, and will have two side yards on the north and south, leading to a chapel in the rear, which will contain a lecture-room church-parlor, and ladies' room on the first floor, and several Sunday-school rooms and a library on the second floor. The body of the church proper will contain six hundred and six sittings, and a gallery to accommodate about two hundred and seventy-six persons, while the lecture-room will be fitted up to seat about three hundred. The building will be in the Romanesque style. The receding centre of the front will be flanked by two projecting towers, the one on the north to be 120 feet in height. The towers will be pierced by twin windows in the first story, single in the second, and arcade windows above. In the interior the finish will be in hard wood for stairs, pews, and wainscoting. The walls and ceilings will be richly ornamented with color. An interesting feature in the interior will be the marble platform and pulpit which served for many years in the old church.

NOT AN OFFICE, BUT AN EMPLOYMENT. — In the suit of Frederick Law Olmsted against New York city, the Superior Court, General Term, Judge Speir giving the opinion, decides that the position of landscape architect of the parks is not an office, but an employment. Mr. Olmsted, while holding the position of landscape architect, accepted the position of commissioner of the state survey. He received no salary for the latter position, and resigned it within three months; but the city declined to pay him for that time, on the ground that the acceptance of any second office is a resignation of a previously held city office. Judge Speir holds that the position on the parks was not an office, and affirms the verdict in Mr. Olmsted's favor.

"CATARINA CORNARO." — Hans Markart's picture is to be shipped to Vienna.

THE DUKE OF BRUNSWICK'S MAUSOLEUM. — The late Duke of Brunswick, who died a few years ago at Paris, was possessed of very considerable wealth in diamonds and other precious stones. His collection was for some time in this country. In a modest house in St. John's Wood, a burglar and fire proof room was built, in which it was kept; but the owner, growing perhaps tired of the monotony of English society, removed to Paris some years before his death, and took with him to that paradise of Yankees the whole of his mineral and other possessions. These, along with other property of immense value, he bequeathed to the city of Geneva: and the municipality, after mature consideration of the most appropriate manner in which to record their gratitude, have resolved to erect a mausoleum to the memory of their benefactor, which shall be without a parallel in Europe. The monument is to be placed in the Jardin des Alpes, and it is to cost 1,400,000 francs, or $240,000. The design includes a series of six statues, representing ancestors of the deceased duke. The first is to be Duke Henry, "the Lion," and the last that of Duke Frederick William, who fell at the battle of Quatre Bras, which immediately preceded the defeat of the French at Waterloo. On a colossal pedestal of polished granite, sixty feet in height, will rest the sarcophagus, on which will be a recumbent figure of the prince; and over this will be a canopy, to be surmounted by an equestrian statue of the late duke in modern civil costume. The canopy is to be supported by pillars of white marble richly sculptured. The artist selected for carrying out this grand design is M. Franc, a citizen of Geneva. The statue is to be by M. Vella, and the animals are to be executed by M. Cave, who are also natives of the canton which the Duke of Brunswick has so magnificently endowed. — *London Globe.*

DODONA. — Fuller accounts of the recent excavations at Dodona have reached us through the *Examiner*. The real position of that ancient Hellenic sanctuary was determined a short time ago by M. Konstantinos Karapanos, who sought for it in the valley of Tsarakobitza, where formerly the town of Passaron was supposed to have been situated. In the neighborhood of this valley there is a projecting hill with a triple group of ruins. On the top are the ruins of a little town with a seven-turreted wall. On the slope of the hill a theatre is seen, which Mr. Martin Leake has already described. To the east of the theatre the sanctuary was placed. A temple court 200 metres long and 90 metres broad, which surrounded a temple of Zeus 40 metres long, has been discovered. Another enclosure measuring 110 metres by 105 metres shows several double rows of pedestals on which votive offerings were placed. These pedestals marked sacred pathways to various sanctuaries; one of which was dedicated to Aphrodite, as is shown by the inscription on a metal wheel, a symbol of the goddess. At Dodona, a mass of metal figures of deities, bronze tablets bearing inscriptions, clay vessels dedicated to Zeus Naïos, Dione, and Aphrodite, ornaments, arms, tools, and more than 80 leaden plates, — a record of oracles, — have been dug up. In the war between Philip V. of Macedonia and the Ætolian league, Dorimachos burned the pillared hall of Dodona, destroyed the votive offerings, and demolished the sanctuary, the remains of which have just been brought to light by M. Karapanos and his French assistants.

A "RUM JOKE." — The Fourth Church, Hartford, Conn., was erected in 1848 and 1849. When the spire approached its completion, and the ornamental finials or hollow balls below the weather-vane were in process of construction, certain residents of North Main Street contributed a quart bottle of fine old rum and a pack of playing-cards, which were placed, without the knowledge of the church committee, in the hollow swell beneath the vane. The bottle of liquor was duly marked with the date (1849), but probably without the names of the contributors; and under these ungodly devices the religious services have been carried on for nearly thirty years, without a suspicion of the situation aloft.

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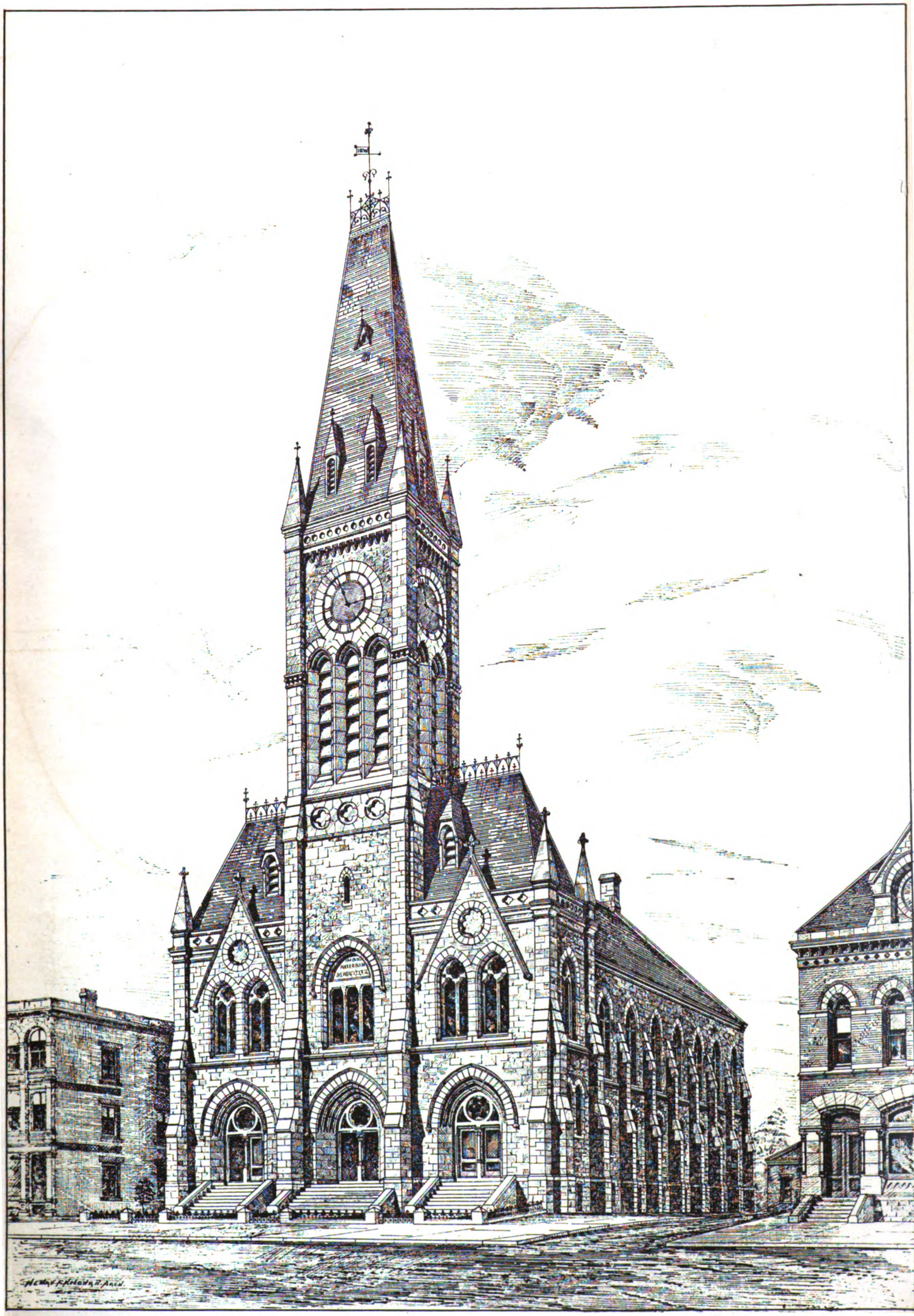

HELIOTYPE

DESIGN FOR THE FIRST CONGREGATIONAL CHURCH. NORTHAMPTON, MASS.

H. E. KILBURN ARCHT.

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DESIGN FOR A SCHOOL HOUSE.

HELIOTYPE

Cottage: West: Virginia.

F. A. WRIGHT, ARCHT.

CORNELL UNIVERSITY.

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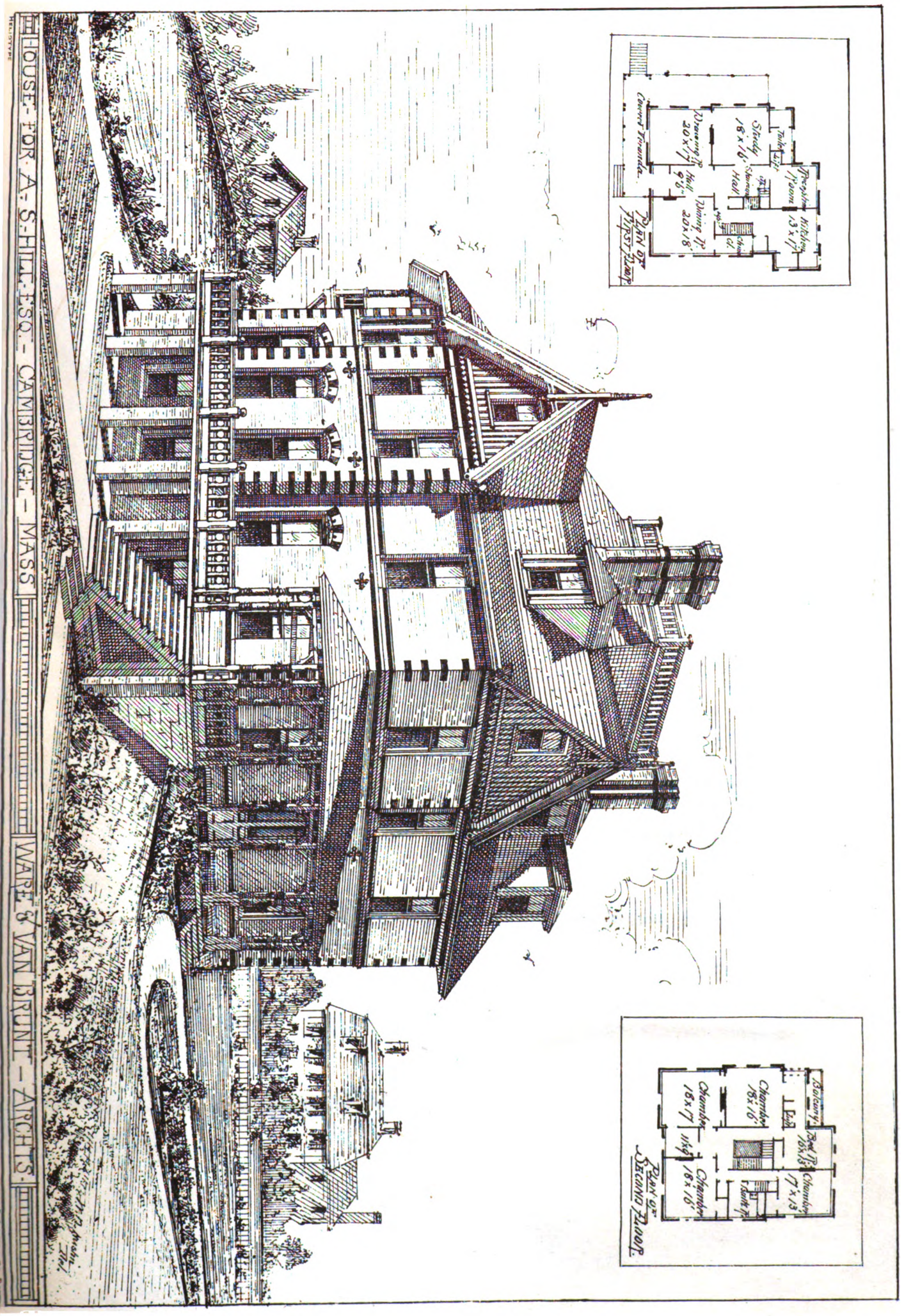

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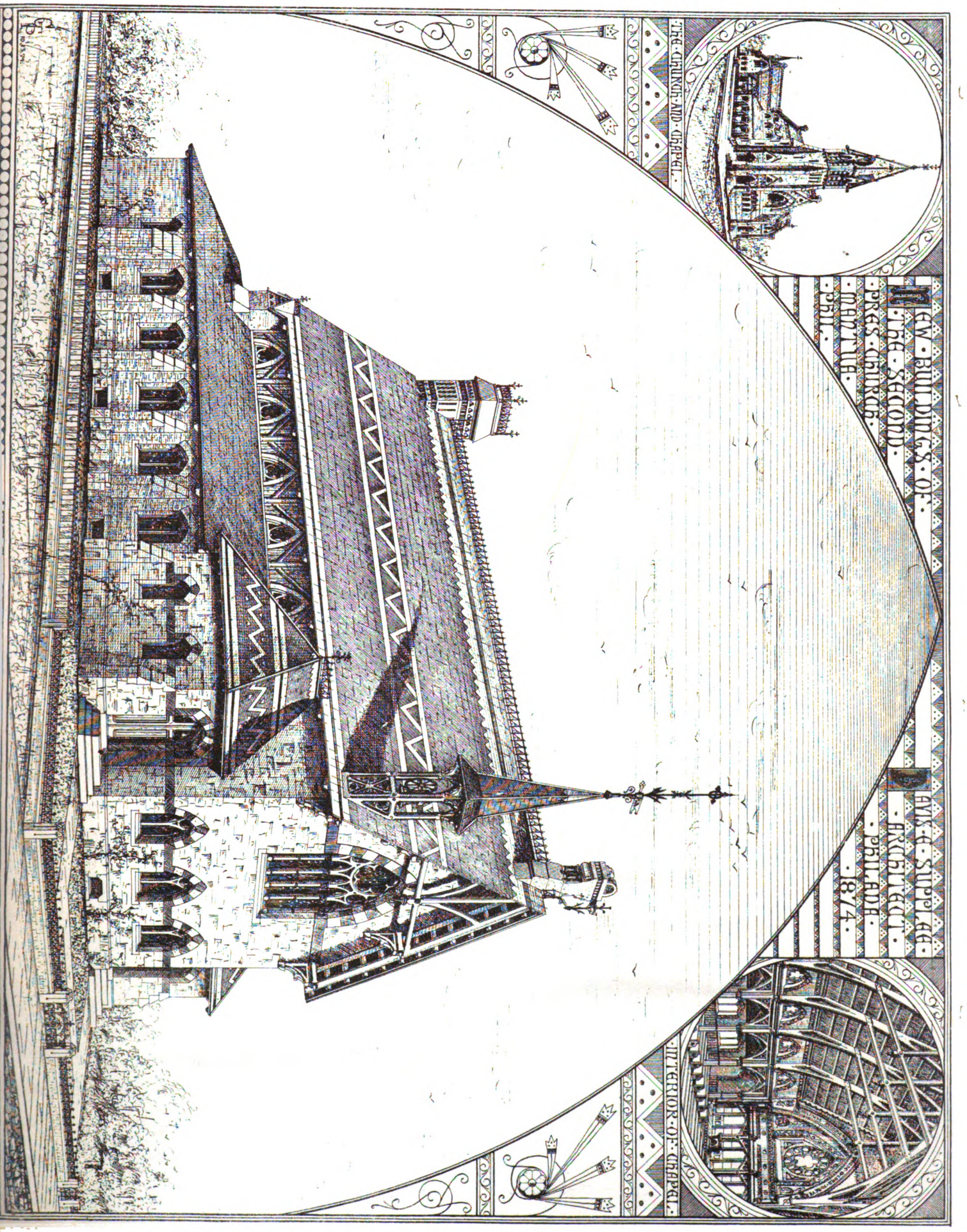

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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PROF. CHANDLER, president of the Board of Health of the city of New York, has given some interesting testimony as to the proper disposition to be made of the large amount of garbage and street-sweepings which is or ought to be collected in the process of cleansing great towns. In New York this question appears to be more serious than elsewhere, because the insulated character of the city seems hitherto to have left no practicable alternative as to the disposal of these foul masses when collected, except to empty them into the sea, there gradually to fill up the channels, or thence to be brought back by the tides, and washed ashore on the north and south sides of the harbor, — a most dangerous and objectionable result. This also involves great expense in the establishment and maintenance of numerous scows and tugs. An analysis of street refuse from thirteen widely separated and fairly representative districts in the city presented the following average results: of water, 3.032 per cent; of combustible matter, 28.454 per cent; of incombustible matter, 68.514 per cent; of nitrogen, 0.369 per cent. Prof. Chandler testifies that if this organic matter were to be submitted to a heat of 112 degrees, the process of decomposition would be arrested; but that when the matter became moist again, decomposition would be resumed. A temperature of 500 degrees, however, would kill all animal and vegetable life in the mass; would render it perfectly harmless and as fit for filling-in purposes as fire ashes. Prof. Chandler, therefore, in the interest of public health, urges the establishment of a system of garbage cremation in furnaces similar to those used for the manufacture of shell-lime. One inventor claims that in his furnace, costing with all its appliances not more than $5,000, by the burning of three or four tons of cheap "slack," or coal-dust, two hundred tons of street refuse and garbage can be "cremated" and rendered innocuous in twenty-four hours. Some such system as this apparently would not only involve far less cost than the objectionable practice of conveying the sewage to deep water, as in New York, but would render the "dumping-grounds" of all great cities far more consistent with the just demands of civilization and public safety.

THE recent excavations of Dr. Schliemann on the sites of ancient Troy and Mycenæ, and the similar explorations which have been carried on at Rome for many years, as well as the occasional accidental exhumation of Roman pavements and villa sites in the older towns of England, to which our attention is drawn at frequent intervals, — all these point to the fact that in the progress of centuries the grades of cities are insensibly raised, even to the extent of the complete obliteration of old landmarks, by the natural accumulations of such rubbish as in modern phrase is called street-sweepings. There are, of course, the accidents of warfare and fire, which may have increased these deposits unduly at certain times; but it is consistent with our own observations, in the neighborhood even of modern cities, and in the course of no more than fifty years, that the street deposits, from whatever cause and frequently without intention, are sufficient seriously to change the natural surfaces of the ground. The winds, which should purify the streets of these cities in sweeping over such districts, must often take up their foul emanations and vapors, and carry with them to the inhabitants the seeds of disease and death. Not only the proper purification but the proper deposit of such great accretions therefore in the vicinity of crowded cities are matters worthy of careful consideration on the part of all those interested in sanitary science. The city government of Boston has, by a recent vote, concluded to purchase a hundred acres of marsh land partially under water, and lying between the peninsula on which the city is built and the main land on the west. This marsh land has of late years become a serious nuisance, by reason of the accumulation of noisome matter left upon it from the sewerage of a large neighboring district. To raise and drain this land and cultivate it as a public park is doubtless a measure of wise economy. But if, as has been suggested, the grading of it is to be partially effected by the deposit of all the street sweepings of the city, it is to be hoped that the Department of Health will provide that such dangerous accumulations are rendered properly innocuous. It is true that in Boston house-offal is carefully distinguished from the garbage and rubbish of the streets, and separately disposed of; but, as is shown by the analysis of the street sweepings in New York, enough gas-producing substances remain to call for especial care in appointing their manner and places of deposit.

WE learn from our Chicago exchanges that the pollution of the lake water by the city drainage has so far extended that the water supply, which, as is well known, is drawn from Lake Michigan through a tunnel carried far out to deep water, has become seriously affected. Prof. Piper draws attention to the discovery in water, taken from the hydrants, of foreign and deleterious matters, among others of certain spores or eggs which he considers dangerous to the health of the community, in the same manner as the spores of the *bothriocephalus*, a certain worm which formerly was the cause of serious diseases among the inhabitants of the shores of the Lake of Geneva, but which entirely disappeared when those waters were purified by the application of various sanitary appliances to the drainage of the bordering towns, notably by changes in the construction of water-closets, which, up to that time, had emptied themselves into the lake. At present the refuse of the towns is carefully collected for the purpose of manuring the land, and many of the former local forms of disease are now unknown. In like manner, as Prof. Tyndall has observed, in the district of Novgorod, in Russia, between the years 1867 and 1870, 828 human beings and 56,000 horses, cattle, and sheep perished by the drinking of water containing the spores of the *bacillus anthracis*. But lest those who are not habitual water-drinkers may derive some comfort from these unsavory statements, Prof. Piper assures his fellow-citizens that the same water in the form of beer or mixed with whiskey is even more deleterious, and that those who indulge in such beverages are the first to succumb to the forms of disease which are generated by these causes.

THE death of Thomas Bellamy, a Fellow of the Royal Institute of British Architects, was noticed at the meeting of May 28. He died on July 10, in the seventy-eighth year of his age. His practice was not large, but his works were remarkable for careful and elaborate study and great refinement of detail. In his most impressionable years he was under the influence and discipline of that form of Greek revival which arose in England on the publication of Stuart and Revett's "Athens," and of the works of the famous Dilettanti Society, — a discipline which unfortunately these later fashions of picturesque and loose mediævalism are not apt to furnish to the young aspirant.

THE preliminary investigations as to the character of the chalk formations underlying the British Channel seem to have verified the forebodings of those who considered the

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submarine tunnel between England and France impracticable by reason of fissures which would be discovered in the stratum. The realization of these forebodings is a disastrous blow to any such method of inter-communication as this; and therefore public attention begins to be turned to the various more familiar and more practicable *open-air* methods which have been suggested by various engineers on either side of the water. Among these, that which seems at present to obtain the greatest favor is the project of M. Verard de St. Anne, who proposes to construct a bridge twenty-one miles long, connecting the opposite points of Folkestone and Cape Grisnez; between these points certain banks called "the Varne" and "the Calbart," much dreaded by navigators, offer admirable facilities for the construction of piers, the ground being strong and calcareous. The former bank is about six miles long, and lies midway between the two points, with the deep channel on either side. M. Chevalier's tunnel was to have been dug at a depth of 410 feet below the channel, was to have been 34½ miles in length, and was to have cost twenty million pounds. The bridge enterprise is set down to cost only twelve millions.. The advantages of shortness, practicability, and cheapness, therefore, seem to be certainly in favor of the open-air project. The proposition of M. Verard de St. Anne includes the establishment of a harbor of refuge in mid-channel on the Varne. A company has already been formed, with the object of giving greater extension to the preparatory scientific investigations necessary to the completion of this gigantic bridge.

THE discussion in the Institute of British Architects at its sessions of May 28 and June 11, over Mr. J. J. Stevenson's paper on Architectural Restorations, extracts from which were printed in our last number, aroused that decorous assembly into unwonted emotions. The paper in question presented the views of the extremists, and in especial arraigned Sir Gilbert Scott and Mr. Street for obliterating more or less completely, by processes of restoration, many precious historical monuments. It called upon them to content themselves with keeping the old churches in repair without destroying the evidence of age; and to leave untouched the successive works in the same building, although incongruous and of varying styles, without attempting to discriminate between them, or trying to obtain an effect of unity by the destruction of such historical records, whether expressed in good or bad art. Both of these architects, in their spirited replies, claimed to be among the most conservative of their kind. That of Sir Gilbert, although not wanting in personalities, and very earnest in its tone, seems in the main dignified and good-humored. It abounds in entertaining examples of misused churches which had been allowed to fall down through a neglect which he called contemptuous; or had been divided by glass partitions and other anachronisms; or absorbed in huge high pews, the "dozing-pens" of the squires. He referred, among others, to Llandaff Cathedral, which was "converted" in the last century by Mr. Wood of Bath, who had just erected the "Pump-room" there. This architect advised that so much of the area as was needed should be cut off, and converted into a double of his famous Pump-room, leaving the rest to fall into greater ruin. Accordingly he walled up the arches, cut off the mouldings where they were in the way, and sheathed the entire wall-surface with battening. By this clever device he was enabled to mask all the objectionable Gothic of the edifice, and to obtain what a contemporary styled a very neat and elegant church. Such examples, Sir Gilbert claimed, are not to be let alone, as the antiquaries require, but, so far as practicable, restored to their original condition. He admitted, however, the difficulty of discriminating between what should be removed and what left, and defended his own practice, or rather intention, in such matters.

To us who are so far removed from the immediate interests involved in the difficult question of restoration, the controversy seems really to be between the clergy, who desire to have the old churches set forth for the convenient and beautiful service of religion, in accordance with the best architectural knowledge available, and the antiquaries, who seem to claim that these churches are primarily historical monuments, to be scrupulously conserved for the sake of the authentic records they present, without regard to convenience or beauty. But it is the architect, the natural agent of the clergy in this work, against whom the antiquaries make their bitterest complaints; and the more learned and artistic the architect, the more bitter the complaint. Old buildings which have remained in use through a succession of centuries naturally receive the architectural impress left upon them by the various alterations and additions made to them with more or less *naïveté* to suit the passing requirements or changing fashions of the day. If such buildings still remain in use, they must still suffer change. It is impossible to stay this process; and if we are more learned than our predecessors, and more familiar with precedents and their significance in history, it is reasonable to suppose that the modern changes will be less harmful than the ancient. Doubtless the modern architect, laboring conscientiously in the service of his time, has frequently been misled by his own knowledge, and has often substituted new for old work injudiciously. But who is to draw the line between what is good and what is bad? This is a matter of judgment, in which respect a recognized master must needs be entitled to greater consideration than any literary person or amateur whatsoever.

It is always instructive to listen to sober and well-considered criticism. Let us therefore see what an authority so moderate and self-contained as Mr. Ruskin has to say touching modern restoration.

VENICE, 15th April, 1877.

MY DEAR SIR, — It is impossible for any one to know the horror and contempt with which I regard modern restoration, but it is so great that it simply paralyzes me in despair, and in the sense of such difference in all thought and feeling between me and the people I live in the midst of, almost makes it useless for me to talk to them. Of course all restoration is accursed architect's jobbery, and will go on as long as they can get their filthy bread by such business. But things are worse here than in England; you have little there left to lose: here, every hour is ruining buildings of inestimable beauty and historical value — simply to keep stone-layers at work. I am obliged to hide my face from it all, and work at other things, or I should die of mere indignation and disgust.

THE PERSONAL RELATION OF ARCHITECT AND CLIENT.

THE service of an architect to his client includes three kinds of work which are inseparably connected, but are in their nature so different that but for the convenience of their intimate co-ordination they might be regularly performed by three different persons, as indeed they often are divided, in practice, among more than one. There is the selection of means for supplying his client's needs — that is, the planning of his buildings; there is the artistic treatment or designing of them; and there is the practical handling of the work — that is, the construction and administration of it. These three kinds of duties concern the client in very different ways, and would, if they were divided in the performance, probably lead to different relations between him and his agents. Thus the handling of the work usually concerns the client only indirectly, and with reference mainly to its influence on the cost, and as a means of giving effect to its planning and design. It is a matter in which, except as regards the general excellence, the finish and substantial quality of the work, and its cost, the client does not usually much interest himself; and which, in fact, he does not assume to understand minutely. He leaves the details of it to his architect, who, under certain easily-defined limitations, does not depend on the client for directions, but is guided by his own technical experience, and is as independent of any intimate consultation with the client as is the grocer who supplies him. The labor performed in this kind of service is absolute, bearing little relation to the individuality of the client; and of a kind which it is pretty easy to reckon, and, if required, explain so that it can be understood. If the architect's service were all or chiefly of this kind, his relation to his employer would be what it is very common to consider it to be, a substantially commercial one, quite impersonal; in which the labor and the compensation could perhaps be allowed for with the minute precision that belongs to business affairs. This kind of service, however, though it is inseparable from an architect's work, and is the portion of it which perhaps looks largest to the eyes of many people, and is apt to be taken as the measure of the rest, is in fact the least characteristic part of it, important as it is; has the least effect in determining his actual relation to his client,

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and might perfectly well be performed if there were no architects in existence; though convenience dictates that while they exist, they shall perform it.

When it comes to the planning of his work, however, the case is very different. Here the architect has to deal not with materials and modes of construction, whose laws are impersonal and unchangeable, but with a series of clients whose needs are all different, who bring him at every turn some new problem to solve, some new want or taste or caprice to consult. What will suit one client will not suit another; the architect's success is in the way he adapts his work in each case to the individual. It makes a difference, it is true, what sort of work is done. With public buildings for instance, when there is no personal client, there are no personal relations, and should be no personal wants or fancies to be suited, though unluckily these do often interfere. But in whatever a client builds for his own use, his wants are paramount. The building of his own house may be taken as the commonest and the typical example. Here the architect's relation ceases to be primarily a business one, and becomes confidential. He must know his client's wants minutely in order to carry them out carefully, and this involves a knowledge of habits, tastes, and manner of living. The position is analogous to that of a confidential lawyer or a family physician. When a client has told his architect in what rooms he will live, and what furniture he will put into them; how many chambers he will have, and how his family will be distributed in them; how many servants he provides for; what conveniences he depends on in the way of kitchens, wash-rooms, bath-rooms, closets, sinks, and bowls; how much money he is going to spend, and where he will lay it out, and where save it; he has already, whether he expected it or not, admitted him to a somewhat confidential footing, more confidential probably than he will be disposed to offer to most of his neighbors. The architect's services become more or less those of personal friendship: their value depends on the unreserve with which the client lets him into minute knowledge of his wishes, and upon the sympathy and zeal with which he enters into them. Without a certain degree of sympathy it is impossible that the architect should do his best service. The refined and fastidious client requires refinement and fastidiousness in his professional adviser, or the best good-will will not make his needs comprehensible. Some degree of intimacy, for the time being at least, is the natural accompaniment of such a relation, the necessary condition of the most acceptable service.

This kind of relation is a matter of course to those who have experienced it, and sufficiently obvious to those who stop to reflect upon it. It is, however, no element of the purely business connection which is commonly assumed to exist; and though we shall find that a tacit, perhaps an uncomprehended, recognition of it is at the bottom of the scheme of payment for architectural services which is in use the world over, yet it has no place in the idea with which inexperienced persons enter into engagements with their architects; and the want of appreciation of it leads to many misunderstandings and disagreeable surprises. The client may take it for granted that his own wants are the wants of the world, and, expecting the architect to understand and provide for them by virtue of his experience, may be disappointed presently at finding that they are things peculiar to himself, which he should have taken pains to make known in good season. Many an annoying bill of extras, and consequent complaint of neglect on the part of an architect, is simply the result of the client's failure to explain fully in the beginning the things on which his mind was set. Many are the disappointments suddenly developed because the architect has not done what it was taken for granted that he would do, though he had not been warned; many the points perhaps at which of two or three ways that might be followed, he has taken, through ignorance of some peculiarity of the client's taste, just the one that pleased him least. There are clients, on the other hand, who err on the opposite side from just the same want of consideration. They come not only with all their wants considered, but with all the means of supplying them minutely prescribed. They have perhaps drawn a plan for themselves, and have not only fixed the size and general disposition of their rooms, but all their appointments, and even their forms of decoration. They want a bay-window, and it must be like such an one that they have seen. The porch on such another's house pleases them, and they want one like it. It is nothing to them that these things do not suit each other, or the house to which they would attach them. It is nothing that the architect of experience, if he once understood what the essentials of their desires were, could suggest for each a dozen means of satisfying it to the one which they have in mind, and probably some which they would prefer if they would look at them. Their minds are bent on their preconceived preferences; they cut themselves off from profiting by a knowledge and experience a hundredfold greater than their own; and the architect has to set himself to the mechanical labor of embodying their crudities or reconciling their incompatibilities in the best form he may; but without interest in his task, because without sympathy with it, and therefore with indifferent success.

It is very easy for the architect, on his part, working from his general experience and sense of the eternal fitness of things, to go on shaping out his work with insufficient knowledge of his client's wants, which he ought to study carefully; or without reference to his tastes, habits, and caprices even, with which, by a little contrivance, he could comply, to his great satisfaction, and to no injury of the work. These are familiar instances of the ill success that results from want of sufficient understanding between employer and architect. Everybody can cite cases where men have built themselves houses, and then found them not at all what they wished or expected; and any architect can say with feeling how often his clients may forestall his best work by inferior devices of their own suggestion. We question, in fact, whether there is any professional relation, except the pastoral and physician's, into which so much of personal familiarity enters, as into the architect's. It is then something distinctly different from an ordinary business relation. The services rendered in it are of a difficult and a more complex kind than those of business agents, and cannot, in the nature of things, be estimated with business precision. The amount and character of the labor they involve will naturally differ as much with the character of the client as with the nature of the problem presented; the personal element will tell on them quite as much as the technical. An uncomfortable and exacting client may double the labor of designing and carrying on a building, and a considerate one may materially lighten it. The degree of confidence that exists between the two will greatly influence both the amount of it and the success of it. There being so much of the element of personal knowledge concerned, it is natural that the architect who has once built for a man is, *ceteris paribus*, the best person to build for him again; and a permanent clientship, like that of a family physician or a confidential lawyer, is of natural growth when a client continues building. The client who by exactions and careless interference wears out his architect's zeal — and no human zeal is indestructible — may know that he cannot possibly get the best work out of his architect, be the latter never so conscientious. The lawyer and the physician may possibly do their work as well in spite of such influences, for the intellect can work in spite of them; but the imagination and the feeling are less independent of circumstances, and cannot be made to do their best at a disadvantage. Here is a warning.

The architect's function in the other kind of work which we distinguished above, that is, in artistic design, is a different one from those we have examined, and gives rise to some interesting questions in his relation to his client, perhaps suggests some limitations of it, but does not in any way alter the character of it, nor add any considerations which affect its confidential quality. It may therefore be left one side in this article. We have dwelt upon this confidential character of his professional relations the more because it is, as we shall see in another article, the essential factor in determining the nature of his compensation, a matter which, from a want of general understanding of its bearing, is in the unfamiliar state of American practice the subject of many misunderstandings and not a few disputes. It may be added that while this complicates the labors of his position, and in a considerable degree increases its difficulties by increasing its delicacy, it brings a compensation of its own in the sense of friendly personal relations and of acceptable personal service rendered. There is a real satisfaction in providing for the wants of a friendly client, to which most architects can testify, and which, apart from a purely professional interest

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in the work, is often the chief recompense to be got from a kind of work which, if in this respect the most agreeable, is usually the most unremunerative of all an architect's labors.

The closeness of this confidential relation varies, as we said, with the kind of work which the architect performs. It is greatest when he builds his client's dwelling, and less and less in other work according as this more or less nearly concerns the actual personal convenience of the client. In public buildings, or buildings that are erected for corporations, and many others, of course the personal element disappears, but the confidential one remains. The architect's service is not merely one which it is not convenient for the client to perform for himself, but one for which he is not competent. It is a thing in which the client must depute an important responsibility to his adviser, and must confide in that adviser's professional judgment for the administration of a duty which he does not himself understand. This is the characteristic which distinguishes a professional from a commercial service. These considerations are the reasons why an architect's service should be, and actually is, in usage classed with those we have instanced, a physician's or a lawyer's, rather than with a broker's or a commission merchant's.

SANITARY ENGINEERING.[1]

II.

MR. DENTON'S division on Water is full of valuable information, being a *résumé* of its sanitary bearings. He places the amount of water actually needed for all manner of domestic use, including the washing of floors, of carriages, etc., at *fifteen gallons* per head per day; and he considers all beyond this, taken for private service, as mere waste. He allows an additional consumption of ten gallons per head for ordinary industries. Leaving out such industries as require an unusual supply, his allowance for the generality of towns is twenty-five gallons per head, and for rural villages fifteen gallons per head. He disregards the opinion of the Water Supply Commissioners of England, that rain water, stored in underground tanks, is objectionable as a source of public supply; and he gives satisfactory reasons for his opinion. Certainly our experience in this country is entirely favorable to his view. The abundance of this source of water to be drawn from roofs and from paved and other impervious surfaces is indicated by the following quotation: —

"It savors of the ridiculous to speak of a water-famine when the total quantity of liquid (of every description) drunk by each person does not, in fact, exceed in amount the quantity of water that would fall as rain in twelve months upon a good-sized umbrella, if exposed for the purpose in either of the counties of Devon or Cornwall."

The use of rain-water which has fallen upon the roof, and which filters through the ground to supply springs, or which flows over the surface to supply brooks and rivers, constitutes a very important source of supply, but one which is more or less suspicious in its character according to the soil through which it has filtered or over which it has run. The conclusion of the River Pollution Commissioners on this subject is thus given: —

"Rain water collected from the roofs of houses, and stored in underground tanks, they state to be much more impure; while the water collected from the surface of cultivated lands, and from the under-drains of cultivated lands, is always more or less polluted with the organic matter of manure, even after subsidence in lakes or reservoirs. Such polluted surface or drainage water is, they declare, not of good quality for domestic purposes; but it may be used with less risk to health than polluted shallow well water, *if human excrementitious matters do not form part of the manure applied to the land.*"

The last clause of this quotation is full of suggestiveness for towns which derive their water supply from streams and ponds fed in whole or in part by the surface flow of cultivated lands. Even polluted waters, when filtered through a well-*aërated* soil, or the water of deep wells, and the outflow of deep under-drains, are stated to have their impurities removed and destroyed by oxidation, and to be of good potable character. The use of deep wells, however, especially as a source of public supply, entails too much cost for pumping to be desirable when any other good source is available. It would often be cheaper to make underground tanks or cisterns for the storage of rain water flowing from well-protected lands than to encounter the expense of pumping.

Mr. Denton holds to the opinion "that, in fact, there exists no more certain source of a pure and sufficient supply than that of properly collected and properly filtered rain-water, which is with care to be secured by all persons alike."

Concerning the use of wells, it is to be remembered that connection between these and the sites of the percolating cesspools very often leads to the transmission of foul matters through deep-lying porous strata, below the reach of atmospheric influences, and where impurities are freely transmitted.

"That the effect of sinking deep wells in the new red sandstone is to lower very sensibly the water level, is supported by the fact that when the corporation of Liverpool sunk the Dudley-Lane well, such was the influence it had upon other wells in the vicinity that several became dry, and the owners converted them into cess-pits for their liquid sewage, which in its turn found its way into the Dudley-Lane well."

Concerning filters, reference is again made to the oxidizing action of porus and well-aërated material.

In subsequent articles we shall take up the very practical suggestions contained in Mr. Denton's work, concerning the processes of Sanitary Engineering.

[1] Sanitary Engineering: a series of lectures delivered before the School of Military Engineering, at Chatham, Eng., by J. Bailey Denton, F. G. S. M. Inst. C. E., etc. E. and F. N. Spon, London and New York.

THE ILLUSTRATIONS.

HOUSE FOR HON. E. C. SPRAGUE, BUFFALO, N.Y. MESSRS. OAKEY AND BLOOR, ARCHITECTS.

(German Insurance Building, Buffalo, N.Y.)

THE materials employed for this house are white limestone for sills, etc., and red brick with red joints. The bays are of hard wood, oiled; the side-panels sheathed with shingles, oiled. The cornice is of galvanized iron, decorated in color by stencilling on the panels formed by the ribs. The roof is of red tile. The porch of hard wood, turned and oiled.

UNITED STATES CUSTOM HOUSE, COURT HOUSE, AND POST OFFICE, ALBANY, N. Y. MR. J. G. HILL, SUPERVISING ARCHITECT, TREASURY DEPARTMENT.

(Washington, D.C.)

FRAME COTTAGE. MR. C. M. MORGAN, ARCHITECT.

(1298 Broadway, New York, N.Y.)

DETAILS FROM STORES IN BOSTON. MESSRS. EMERSON AND FEHMER, ARCHITECTS.

This is another of the drawings prepared for the Portfolio Club.

STUDY OF INTERIOR DECORATION. — PLATE X.

This drawing referred to in Article XII. of the series of papers with the above title, which appeared in our number of June 30, has been accidently delayed until now. The notes of color in the margin of the drawing may serve to recall the points in that article which it undertakes to illustrate.

The word *passion* in the 5th line of that article should have been printed *fashion;* the word *sufficiently* in the 19th line on page 205 should have been *efficiently;* and the word *border*, 8 lines farther on, should have been *bolder.*

CORRESPONDENCE.

ARCHITECTURE AT THE ROYAL ACADEMY. — II.

LONDON, June 21, 1877.

RESUMING our notes with the results of another competition, that for the Shakespeare Memorial Theatre at Stratford-on-Avon, we find the successful design is that by Messrs. Dodgshan and Unsworth, a very picturesque work in the old English style shown in a very fair drawing. The theatre proper is perhaps the best part of the composition: in form it seems to remind one of the great dramatist's own theatre, "The Globe," and in style is not only altogether suited to Stratford and its associations, but is a very clever piece of treatment. The circular form of the plan is preserved in the exterior, and is covered with a conical roof; the materials are evidently brick with tile roofs, and round the upper part of the walls is an overhanging passage or gallery of half-timbered work. The picture-gallery is not quite so successful, especially the glass roof with which it is covered; but the connecting porch and passage between the two is again a good piece of design, cleverly worked out. Altogether a good deal of originality is displayed, and, what is more to the purpose, this is attained without the sacrifice of good architecture. The other design shown is by Mr. H. R. Florence: it is Italian in character, and, though very well drawn, is not so good as the last mentioned. It is more pretentious and more monumental, but does not seem nearly so appropriate to the work in hand: it is probably more academic, but not nearly so artistic; and, above all, it is not so English. Considering it is Shakespeare and his native town that are being dealt with, this is a point of more importance than usual. Your readers will be glad to hear that the successful design is being built, and that there is some prospect of the whole scheme being thoroughly carried out.

Mr. Robson, the architect to the London School Board, gives us a suburban villa at Wandsworth: it is very good, but not nearly so clever as some of his school designs, which it resembles in most of its leading features; indeed, it might pass for a head master's house, say for one of the largest. Then we have two of the now noteworthy schools themselves: one, Hanover School, Islington, is very

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picturesque and very well designed, helped probably a good deal by the site, which is by the side of a canal, a feature taken every advantage of in the very well executed drawing. The style is the usual version of Queen Anne with which we are now familiar in the buildings of the London School Board. In conjunction with Messrs. Flockton and Abbott, Mr. Robson also sends a design for Frith College School Board Offices and Central Schools, Sheffield, a large group of buildings not very well thrown together; a conglomeration of Queen Anne features, with no very distinct meaning about them.

Mr. J. L. Pearson, A.R.A., sends two contributions: the Parish Church at Horsforth, Leeds, and St. Michael and All Angels, Croyden. The former has a good east end, but the rest of it is only middling. The latter is a very fine church indeed; early English in style, and in Mr. Pearson's best manner, full of good proportion and beautiful detail, worked out with that delicacy and grace for which he is famous. Thus both the architectural associations come out strong in church work this year.

In No. 1,141, we have the first instalment of the new buildings destined to make or mar London's latest metropolitan improvement, Northumberland Avenue; a block of offices and warehouses, to be built by the Society for Promoting Christian Knowledge, and designed by Mr. J. Gibson. This building is to stand at the north-east corner of the new street, facing Charing Cross, and on part of the site now occupied by old Northumberland House, one of the most splendid sites in all London. For this Mr. Gibson gives us a somewhat plain front of the ordinary classic type, neither very good nor very bad; nothing very striking, and on the other hand nothing to offend. For the latter we ought to be very thankful, as so much cannot be said of many other fine sites; but, considering all the consultations between the Board of Works and the Royal Institute of British Architects as to the best method of securing the finest architecture for the grand new street, this instalment is rather disappointing. Probably if less had been said on the subject, less would have been expected; but as it is, this is the sort of architecture of which any number of examples can be found in the city, equally good and equally commonplace. When this has been said, there seems nothing more to add, except that if this is to be taken as the key-note of what we are to expect, we are afraid that architecturally, at all events, the avenue will hardly be the finest thoroughfare in Europe, such as we are given to understand it was the intention to make it.

No. 1,149 is another piece of classic architecture similar to the last, being Mr. J. C. Clarke's new Bank of Scotland, now building in Bishopsgate Street. The ground-floor story is very poor; but the upper part is very good, and the whole is the ordinary respectable classic of the regulation type just referred to; this time it is in a city street on an ordinary site, and looks as usual; carefully detailed and carefully carried out, but only commonplace after all; safe and good, but commonplace for all that. 1,150, a big classic hotel by Mr. Ellis, for Waterloo Bridge, with only its size to recommend it. 1,152, more classic, but this time of a more ambitious type, is the interior for a proposed design for rebuilding the oratory at Brompton by Mr. F. W. Moody. This church reminds one of some of the large French classic churches; an arcaded nave with side aisles, dome, and apsidal chancel, and has a certain breadth of treatment and largeness of handling, which would be extremely effective should it ever be carried out, which, however, is very problematical: it is somewhat like the Roman Catholic Cathedral of Westminster in this respect — it exists only on paper, and is likely to remain there for many years to come. No. 1,162, an example of interior decoration by Mr. H. W. Battey, is notable as a good study of color, very harmonious and quiet. 1,165, the Children's Hospital at Cardiff, by Mr. J. D. Sedding, is a homely piece of Queen Anne, rather more Gothic in feeling than usual, but very artistic in design, and carefully worked out. 1,167 and 1,172 are a couple of very good churches: the former by Mr. J. O. Scott for Slogh parish, and the latter by Messrs. Dawkes and Clarke for Beckenham; both in the English type of Gothic. The second is particularly fine, telling throughout with good detail and proportion. 1,173, Holloway College, Surrey, by Mr. W. H. Crossland, is a large building in French classic of the Château de Blois type; it is fairly well carried out, looks what it is, and seems very fit for its purpose.

Mr. J. E. Collcutt gives us a view of the red brick house he has built in Bloomsbury Square; an artistically designed front, semi Queen Anne in style. The work looks better in execution than it does in the drawing, even though it stands out very abruptly from the surrounding commonplace houses among which it is built. The gable is made rather too much of, and is too pointed for good proportion; but it shows how picturesque our streets and squares might be if we had only a few more of such houses in them. The above about exhausts the list of notable works: though several more follow, there is nothing remarkable about them. The houses on the new Cadagon estate, for instance, may look all right when built, but they do not promise much from the drawings sent to represent them here, such as those by Mr. Robinson, by Mr. William Young, or even those by Mr. Stevenson, — all more or less Queen Anne in character, and bad character too in many respects. There does not seem to be much gain in getting variety and quantity of features huddled together at the expense of beauty of form and detail; and this is what a good deal of so-called Queen Anne is drifting into. The truth is, it requires the designer to have much more artistic power in him than is displayed by many of the architects who now work in Queen Anne, to treat it properly; the consequence is that many recent examples are coarse and vulgar in detail, and ugly in form, whereas the very essence of the style, in the hands of those who know how to treat it, is its refinement and grace of form and feature.

There are a number of admirable drawings of old work at Burlington House: such as is shown in No. 1,068, parts of the cathedrals of Sens and Canterbury, drawn by Mr. Weatherby for illustration to Sir G. G. Scott's lectures at the Academy; by 1,077, the vestibule of St. Mary's Abbey, York, by the same artist, and for the same purpose; No. 1,088, the Middle House, Mayfield, Sussex, by Mr. Maurice B. Adams, an excellent rendering of an old English house; the Parish Churches, Hayling Island, Hants, also by Mr. Adams; and again another drawing by Mr. Weatherby for Sir G. G. Scott's lectures, a part of the choir of Ripon; and the north side of Chartres Cathedral, by Mr. A. Webb. Then there are two or three little bits from Italy, — a pulpit from San Fermo Maggiore, Verona, by Mr. A. H. Haig; and the tower of the Duomo, Pistoja, by Mr. P. J. Marvin; besides a clever water-color drawing by Mr. Romaine-Walker, of a view in Henry VII.'s Chapel, Westminster: all of which go to prove that good draughtsmanship has not yet died out among us.

Thus on a review of the whole, we may fairly admit that the display is up to the average both in point of design and drawing; and though many good names are still absent, such as Nesfield, Davey, Philip Webb, Bently, Godwin, Johnstone of Newcastle, etc., in this respect we have much more variety than last year. The mention of the last name reminds me that few provincial architects of note send drawings to the Academy: perhaps there is not much encouragement for them to do so, though as this is the only display of the year in the metropolis, it might command more attention in this way than it seems to do at present. If it is to be an architectural exhibition, it ought to be made as good as possible, and it can only be so by the best men among us sending drawings of their works; and yet how many fine buildings are done throughout the year that never find any illustration at all either on the walls of the Academy or in the professional papers! As an instance of this we could name the mansion house of Kimnel in North Wales, by Mr. Nesfield; probably the finest as well as the largest example of the Queen Anne style yet built since the revival, and no one who knows Mr. Nesfield will need to be told how thoroughly and how artistically it is all designed and carried out; yet so far as we know, no illustrations of any kind have ever been given of it.

The Academy is the only institution which can grant any honors, such as they are, of no great value to an architect, perhaps; but so long as it claims to be the Royal Academy of Arts, to be an exhibition of painting, sculpture, and architecture, and to teach all the three, the architects have it in their power to make those honors more highly prized, and its exhibitions more valuable, by giving it the best support they can with the most important of their works, and the benefit of their experience.

THE NEW BUILDINGS FOR TRINITY COLLEGE.

HARTFORD, CONN., June 30, 1877.

To the occasional visitor to the site of the new Trinity College in this city, the building about which so much has been said and written still appears to be as great a conundrum as ever. The public generally seems to be at a loss how to reconcile itself to the absence of quadrangles which were so charmingly pictured forth in the photograph taken from the architect's perspective drawing of the entire work.

As yet the quadrangle principle is undeveloped, and there is nothing to suggest it in the present line of structures, except the toothings of stone at the extreme end of one block, which calmly await the addition of the first cross line of blocks, thus hinting at the great and important idea of the entire plan. Of the work which has already been done, and of that which is now approaching completion, much can truthfully be said in favor.

With the exception of the gateway building, the line of structures forming the western side of the large quadrangle will shortly be finished. It consists of a dormitory and a lecture-room block, each 286 feet long by 35 feet in width, having central portions with front and rear projections, and carried up one story higher than the adjoining wings. A portion of the gateway is now being erected; and it is hoped, for architectural reasons if for nothing else, that it will not share the fate of some other city structures, and be left in an unfinished condition.

For good sound workmanship and solidity of construction, the buildings have no equal in this vicinity; and the success with which the work has been carried out is owing, in a large degree, to the personal attention of the superintending architect, Mr. F. H. Kimball. As a matter of course in this land of free thought and free opinions, verdicts as to the external appearance of the college differ; but the readers of the *American Architect and Building News* who are familiar, through the columns of London publications, with the works of Mr. W. Burges, have but to learn that the

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design of the new Trinity College is from his hands, to be able to judge of its beauty and worth. Unlike many of the more recent collegiate structures, as at Harvard or at Princeton for example, the Trinity buildings are low; there is a basement, some nine or ten feet in the clear, with ground, first, and second stories; the rooms in the latter being lighted by dormer windows; and the whole height of the wings of the block, from the water-table to the top of the cornice, being but 24 feet. In the dormitory-block, a suite of rooms for the accommodation of two students occupies the entire width of the block, the "study" having an outlook upon the quadrangle (of the future), and the bedrooms, which face to the west, affording from their windows a rarely beautiful view of country. The advantage of this arrangement of rooms over that of having a longitudinal hall is obvious for many reasons. The bed-rooms, in the present instance, fully justify the use of "snug" as a descriptive adjective, and offer to the reckless lodger temptation to break down the "middle wall of partition," which, however, must be withstood, as the wall is of brick well bonded with hoop-iron. The "study" is a more comfortable apartment. It is about 15 feet wide by 16½ feet long and 10 feet high. In regard to it, the critic, standing upon the campus, invariably observes that "the windows are too small." From the outside, it must be confessed, the windows are deceptive as regards their resources; but from the interior they appear in a new light, and when the walls of the rooms are finished, no difficulty will be experienced even on cloudy days. The windows which light the "study" are three in number, grouped together, having jambs, transoms, mullions, etc., of Ohio stone. The openings are one foot eight inches wide by about two feet eight inches high, the transom lights being square.

Many buildings rely for their effectiveness upon two things: the pleasing outline afforded, and the successful carrying out of details. In the case of the new college buildings, these two points are prominently illustrated. The otherwise continuous outline of the long blocks is happily diversified by the extension of the central portions referred to, while the thoroughly excellent treatment of the two gables in this part of the design adds greatly to the general effect. The ultimate completion of the gateway will make still another and more important break in the sky-line, as the building will be carried up nearly a hundred feet from the ground-level; and although the height may at first seem disproportionate to the adjoining blocks, still judgment on this point must be made with reference to future work and completed effect.

All the details of the buildings derive much of their power from the boldness of their execution. This is particularly noticed in the label mouldings, the string-courses, the copings, the treatment of window-heads, etc. Wherever a diaper is used, as, for example, in the gables of the central portion, the patterns are simple, all intricacy of design being avoided. Among the prominent features of the blocks are the chimneys, which are universally admired. They are built up of rock-face Portland stone, the same material that is used for the ashlar work, with weatherings of Ohio stone, and finely cut caps of the same. They are of good proportions, and besides their beauty of design, they are of practical value for ventilation; and the number of flues which they contain both for ventilation and for the escape of smoke is almost incredible.

Something of an experiment is to be introduced in the casement windows of the dormitory block. These are made of cast iron, and will swing outward, being constructed with spring-bolts, so that they can be partially opened if desired, and a greater or less amount of air admitted. The swinging casements are to be set in the windows proper, while the transom lights will be stationary. The sash will be glazed with a border of two-inch lights, the central one having a cross-bar or not, according to size and location. In the case of triple windows, which are extensively used, the side casements of the transom lights will be uniform in design, while the middle one will present a different pattern. This style of iron-work is extensively used abroad, whence the college imported a single casement; but its adoption in this country is not as yet common.

While speaking of imported work, mention might here be made of the ridge tile used upon the buildings. It is conspicuous from a distance, and has the appearance of a band of red ribbon. As a finish to roofs, it is immeasurably superior to the ordinary iron cresting whose patterns are in nine cases out of ten indistinct except upon close inspection. At the present time it is not necessary of course to send abroad for ridge and roof tile, as we have home manufacture of terra-cotta work; and to say the least it is not an economical investment unless they are packed with great care, as the breakage is astonishing to contemplate, if one may judge from the number of broken tile seen about the college buildings. The tiles crown not only the principal ridges, but those of the dormers. In the dormitory block the larger dormers are constructed with triple windows built of Ohio stone, the sides being slated in conformity with the roofs. They are to be surmounted with finials carved after imported models. In addition to the stone dormers there are single ones of wood which light the hall-ways. They are very diminutive by comparison, but are pleasing to the eye both in design and color, the latter being a rich Indian red tint. The finials for these windows are extremely picturesque. They are made of lead with four "horns" supported on an iron rod, which fastened to the ridge of the dormer below, runs up and terminates in a steel point forming a pivot for the revolution of the copper flag above. The flag is gilded, and its face is perforated with a grotesque pattern; to preserve its equilibrium, a prong runs out on the opposite side having at its farther extremity a ball loaded with shot.

One of the most characteristic points of detail in the interior of the buildings is the regard paid to mantels and chimney pieces. In every instance they are of stone, the Ohio stone being used. According to location they vary in design; those in the students' rooms are plain, the opening having a segmental arch with a chamfer, which carried down upon the inner edges of the jambs, is finished with a stop; the outer edges of the jamb-stone are laid irregularly, and the shelf has simply a bevelled edge. In the rooms assigned to junior professors, and located in the central portions of the blocks, the mantels have the front decorated with sunk panels of quatrefoil pattern. It may be considered somewhat of a departure in college architecture to set up in the lecture and recitation rooms such beautiful specimens of stone-work as are to be seen in these new buildings. The chimney-pieces with the great stone hoods and bold projections form an imposing feature of the apartments. In some instances chimney-pieces are twelve feet high and six feet wide, rising from the floor nearly to the ceiling, as the rooms are [illegible] feet in height. At a future time carvings and foliated work enrich these mantels; but even at the present time they are not only beautiful in design, but executed with a fidelity to detail most praiseworthy. Ohio stone is used for interior work in many other instances, notably in the jambs of doors opening from the various hall-ways, where the effect is particularly good. In the lecture-room block are seen many finely cut stone corbels for the support of iron beams, which in their design carry out the same general principle of simplicity and boldness of detail. The windows of the recitation-rooms being at a considerable height from the floor, will not have the iron casements before described, but will be fitted with lead sashes similar to those used in churches, and arranged to open by means of cords. As is generally known, the plan of the college provides separate buildings for a chapel, library, dining-hall, museum, etc., which are to be located in the cross lines and completing lines of the quadrangle. Of these it has been decided to build three instead of four as originally laid out, the central one being the largest, and having one to the north and one to the south.

In the absence of many of these separate structures, temporary arrangements have been made in the building known as the lecture-room block, so that it will soon be possible for a student to attend morning prayers, go to recitation, eat his dinner, draw books from the library, revel in the mysteries of geological formations, and in a few cases retire to his room for the night, scarcely going out of doors for the purpose. This is a wonderful example of what is so much cried up at the present time, namely, "condensation." As before mentioned, the gateway is to be partially built. It will probably be carried up one story, this being a case of necessity, as the kitchen, laundry, etc., are to be located in the basement. Immediately west of it, and sunk to a level with the ground, is the boiler-room. The steam heating is to be done both by high pressure and low pressure, the contract being carried out by the Walker and Pratt Manufacturing Company of Boston. During the past year the contractors for the light stone-work, Messrs. Ellin and Co. of New York, have had a diamond saw running at their temporary works upon the college site. As a labor-saving machine its powers have been fully tested; and though put up at considerable cost, like many other things it pays in the long run. Among the objects which attract the attention of visitors at the grounds is a model in the architect's office. It represents the two blocks about to be completed, together with the intervening gateway when finished; it is built to an eighth of an inch scale. Pine blocks of the proper dimensions have fastened to them all projecting work in the shape of chimneys, dormers, etc., and upon the entire face is glued a carefully prepared elevation drawing, the light stone-work being tinted, as are the main roofs and those of the dormers, these, however, being colored directly upon the wood. The effect produced is picturesque, and from it the appearance of the whole line of completed buildings can be directly learned.

At the recent commencement, in view of the early occupation of the new site, considerable enthusiasm was expressed by graduates and others particularly interested in the secret society organizations, with reference to the erection of buildings for the occupancy of the various associations. In the course of a few years, doubtless the "Halls" will be as conspicuous about Trinity College as they are at Yale, though the miscellaneous use of different building materials adopted in New Haven by the college fraternities is not to be as much regretted there as it would in the present instance were the same idea repeated, as there is to be a harmony in the architectural expression of all the new Trinity College buildings proper, and this should extend to the secret society halls which may be built upon or near the new site. CHETWOOD.

DISCOVERER OF CALIFORNIA GOLD. — A monument is to be erected at Coloma, Cal., in honor of Marshall, the discoverer of gold.

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CENTRAL PARK.

NEW YORK.

TO THE EDITOR OF THE AMERICAN ARCHITECT.

Sir, — Under the heading of "The Central Park" there appears in a recent issue (June 2, p. 175) some further remark from one of the landscape architects of the Park, on the brief paragraph devoted to that fine work of art in the opening address I prepared for the last convention of the Institute of Architects. Allow me to meet such of your correspondent's observations as can fairly be adjudged within the range of that paragraph.

Fortunately, the "credit" of any "profession" can, as a whole, be neither marred nor mended by the utterance or action of any single member. Moreover, in this case, the Institute, according to a regulation of its Committee on Publications, is not responsible for the individual utterances of its members through its publications.

I am glad your correspondent appreciates the praise I thought I could fairly bestow on his work in my "architectural minute as to the design of the Central Park;" but he somewhat overstates it. If in the phrase "general design" he includes the structures on the Park, I do not credit him with any part of it; and as to the foundational portion of the landscape design, I say expressly that it "had been outlined and the first rough steps of the work initiated" by another person. Not that your correspondent may not have inspired his original associate with ideas for the architectural design, just as he assures us of the *vice versa* aspect of the case. The work performed on the Central Park — in its earlier stages, at least — was essentially one of co-operation, as I took occasion to specify in a former paper of mine, on "Architectural and other Art Societies" (p. 60, or 124 of the series) published by the Institute in 1869.

I did take great pains that the record employed for my address should be authentic; but to fill out to completeness the skeleton representing the building art-work of a century in the life of a nation would far outstrip the limitations of an occasional discourse.

Is it not, then, somewhat *mal àpropos* to speak of "circumstances" as "wholly lost sight of, and forgotten," the introduction of which into the record would be a mere intrusion on limited ground already crowded?

I know there are quite a number of erroneous popular impressions about architects; and it is manifestly proper in your correspondent to do his share in dissipating them, since he has found the co-operation of architects a great furtherance to his plans. But I fancy some of them will learn for the first time, and with surprise, of the existence of any *popular* impression which divorces their "special training" from successfully coping with "works of landscape design."

A. J. BLOOR.

HOW TO LAY A DRAIN.[1]

BEFORE treating of the general principles to be followed in house drainage, I may remark that in the selection of the materials of our drains there is now much choice. The use of glazed fire-clay or earthenware pipes is almost universal. Cement pipes have been recommended by an eminent authority, but as I have had no experience of them it is not necessary for me to do more than mention them. No one would now propose to use brick or stone culverts or drains, square in section, with sides of brick and bottom of slate, as were formerly in vogue. Practically, then, our choice of materials is limited; but, as usual, there are great variations in the quality of the article supplied not only by different but by the same manufacturers. What the architect should insist upon is a strong, well-burned material, accuracy in form both sectionally and longitudinally, true sockets, and a good, smooth glaze. The smaller pipes are especially liable to be twisted longitudinally, and such should be at once rejected. Pipes having a rough interior should not be used, as lumps and blisters in the glaze accumulate material round them, and injure the efficiency of the drain.

At the risk of being accused of putting the cart before the horse, I will also explain the practical art of laying drain-pipes, and the fall it is necessary to give them, before touching upon the general question of how to design house drainage. I do this because I consider the proper laying of the pipes one of the most important parts of drainage, and the one in which failures must often occur, and without which any system of house drainage will not perform its functions satisfactorily. The true laying of a pipe is of more importance than its quality. An inferior, rough, and crooked pipe may, if laid properly, under ordinary circumstances be made to perform its work satisfactorily; whereas the best-made pipes in the world will only act for a time, and then inefficiently, if laid in those beautiful vertical and horizontal sweeps and undulations known as "Hogarth's line of beauty," so frequently met with when a drain is bared to be taken up, and only then seen in its full perfection.

The righteous indignation of the bricklayer and his laborers employed in taking the drain up, against the tradesmen who laid it down, is only fully appreciated when, on having to take it up a second time, we find these honest men have put in a pipe without a socket, or a square junction, or a junction turned the wrong way, or accidentally omitted to make a joint good, or done or left undone some one of those multitudinous things essential to good workmanship. Truly the architect's bed is one more of thorns than roses.

The next thing to be determined on is the fall, and I cannot too strongly insist upon the necessity in all cases of having the levels first accurately taken, and a section made, before the drains are put in. This is an additional trouble, no doubt, but will be amply repaid in the quality of the work. Of course when the whole of the trenches can be opened at once, this is not always necessary; but it more often happens that the trench has to be filled up as the work proceeds, either from the nature of the ground or the exigencies of the site. The architect should of course aim at getting the greatest amount of fall from the sewer to the junction with the branch drains of the house, keeping in view that these should themselves have quicker gradients than the main drain. A fall of 1 in 48, or half an inch to a pipe, is a good one for a main drain; but it sometimes happens that this cannot be obtained; nay, I have myself had to lay them nearly level, but in such cases special flushing arrangements are absolutely necessary. The usual system pursued by the "honest bricklayer" is to start from the main sewer, and lay each pipe to a fall by a straight-edge, with a piece of wood planted on one end. The size of this piece is determined by some rule, no doubt, — probably the rule of thumb, — a rule, I need scarcely say, of very wide and universal application. By means of these implements the drain gradually rises towards the house, but whether it hits the exact level, or falls below it, or is a foot or two higher, Providence alone can determine; at all events, I may say it is not so certain to work out right as were the two driftways through Mont Cenis. It not seldom happens that if the workman finds he has made a bungle, and got too high, he either carries his drain on a level or actually dips it the wrong way. And what does the architect do? He sees the end of the pipe at the proper level, and all the rest carefully covered up, and probably assumes that all is right.

There is another internal defect arising from this way of laying pipes: they are laid by the flanges, and the inverts, which are of primary importance, are left to take care of themselves. I have never seen, outside of my own practice, house drains laid by their inverts; but I consider this should, where the fall is limited, always be done. It is readily done, but the drain layer has to be taught, and it is a good deal of trouble to teach him, but not more than I hope any architect interested in the perfection of his work would undertake.

The method of proceeding is by fixing sight rails at the two ends of the drain, and sighting a boning rod, with a T piece at the top and a bent piece of iron or shoe to fit on to the invert at the bottom. This of course usually involves a correct system of levels and bench-marks, with the depths figured on the drawing.

The joints should in all cases be made in cement, half Portland cement and half sand is a good proportion; and special care should be taken to scrape out the cement on the inside of the joint so as to leave as perfect a tube as possible, free from lumps and obstructions. I need scarcely say half-bricks should not be left in the pipes, but I have not unfrequently found them there.

[1] From a paper by Mr. T. Mellard Reade, C. E., read before the Liverpool Architectural Society.

LIGHTNING-CONDUCTORS.

MR. R. H. BRUNTON, who has had considerable experience in fixing lightning-conductors in Japan, where thunder-storms are frequent and severe, says: "It is believed that a lightning-conductor, unless thoroughly insulated, is worse than useless, as it attracts the lightning without carrying it away safely. Now, an efficient lightning-conductor should afford greater facilities for the escape of the electric current to the earth than any thing which surrounds it. Electricity is attracted to the best conductor, and will not leave it in any appreciable quantity, to pass along a worse. The notion, therefore, that a flash of lightning will leave a copper rod whose extremity is sunk in good earth, in order to penetrate bricks and mortar, is most fallacious. On the contrary, I have found it necessary to connect the building at various intervals and the conductor by means of copper bats, and also to connect it with all exposed iron or other metal. To insulate a conductor is to prevent the escape from a wall of all the electricity which it collects during a storm. I have seen an iron erection placed on a stone base so charged that showers of sparks flew from it to the hands and clothes of men in its vicinity. The most important matter in fixing a conductor is to obtain good earth for its termination. This, while easy of accomplishment in the neighborhood of London, is attended with more difficulty in rocky localities; and where any doubt exists in regard to it, I would suggest testing the earth and the conductor by sending a current of electricity from a battery, through a circuit of which they form a portion. Copper rod or copper wire rope is the best material of which to make a conductor; and its upper extremity should always be some height above the highest point in a building, so as to enable it to gain possession of the lightning before it is attracted by the building. The conductor should be perfectly continuous, and sharp corners or angles should be avoided. Where rods are used, care should be taken that the ends are clean, and that they butt against

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one another at their points of connection. It should be attached to the building by means of copper bats or staples, every eight or ten feet. My experience of lightning-conductors fitted up on these principles on nearly forty lofty buildings, which have been exposed to frequent violent thunder-storms, is that they afford an almost perfect immunity."

NOTES AND CLIPPINGS.

OBSTRUCTING A NEIGHBOR'S VIEW. — In the suit of William D. Shipman, assignee of William Butler Duncan, against Nathan P. Beers, Judge Barrett, in supreme court, chambers, decides that in no case, except by express covenant or very plainly implied purpose, can the owner of one piece of property prevent an adjoining owner from building on his own property so as to darken the windows of the other. The plaintiff owns a long lease on No. 1 Fifth Avenue, N.Y., from the Sailors' Snug Harbor. Defendant owns a similar lease on No. 3 Fifth Avenue. Both derive their title from James Boorman. When Boorman parted with his rights in No. 3, there was a building covering nearly the whole lot of No. 1, 39 feet x 100. On No. 3 the building only extended back 50 feet, and there were windows in No. 1 looking out on the court-yard of No. 3. Now the defendant proposes to build on No. 3 farther back; and plaintiff asks an injunction on the ground that there was an implied easement of lights granted by Boorman in parting with the premises as they then stood, to which his grantee is subject. Judge Barrett concludes that no such implication arises at law, and refuses an injunction.

A HIGH LEVEL. — The highest point yet attained by any railroad in this country has been reached on the summit of Laveta Pass, in the Sangre de Cristo Mountains, Nev., by the south-western extension of the Denver and Rio Grande Railroad. The altitude of the summit is 9,340 feet.

THE WASHINGTON MONUMENT. — At a meeting of the Washington Monument Association, July 5, Gen. Meigs submitted a plan to finish the present structure with a metallic spire 140 feet high, making a total height of 442 feet. The additional weight will be 4,147,000 pounds. Gen. Meigs also approved the plan of Larkin G. Mead to complete the monument by placing a colossal statue of Washington upon the present structure. This figure of Washington would be eighty-five feet in height, and of light hammered metal, so that the additional weight would be inconsiderable.

MONUMENT TO CAPT. COOK. — The granite obelisk which the English are to erect to the memory of Capt. Cook is now completed. It is to be placed upon a mound overlooking the beach at Hawaii where he was assassinated, and will be surrounded by thirty-two cannon fixed vertically in the earth and connected to one another by chains.

FALL OF A BUILDING. — On July 6, a building, while being removed from the site of the new Ashuelot depot at Keene, N.H., fell and fatally injured several of the men at work upon it.

SPARED BY THE GREAT FIRE. — The monument raised to the memory of John Donne, poet and divine, and executed from his own design, is the sole memorial of the former Cathedral of St. Paul which escaped destruction at the great fire. For many years it lay in the crypt unknown and neglected; but three or four years ago it was found and set up in its present position. Donne was born in 1640.

THE MAN OF ROSS AND HIS FAVORITE TREES. — The following anecdote is taken from a paper read before the Indian section of the Society of Arts not long ago: —

One other remarkable instance of mysterious or at least unaccountable growth has for many years attracted attention and surprise at Ross, in Herefordshire. The story, which has been related to me by several eye-witnesses, is this: The Man of Ross is a name and character which has been immortalized in the well-known lines of Pope. He was peculiarly partial to the elm-tree, many of which he had cherished with peculiar devotion. So long as he lived, no one presumed to interfere with his cherished favorites; but after his death several trees made their appearance at the door of the church, gradually forced their way into the interior, passed through the Man of Ross's pew, and grew up together inside the church, where they are still growing side by side, occasionally lopped when rising so high as to touch the roof.

WORK AT THE TROCADÉRO. — Because of the intense heat at Paris, the number of men employed at the building upon the Trocadéro has been temporarily reduced from 800 to 200.

STATUE OF VICTOR EMANUEL. — The equestrian statue of Victor Emanuel, recently obtained from Prince Doria in return for some concessions from the municipal government of Rome, has somewhat of a history. During the term of Prince Doria's mayoralty in the very commencement of the present government, he bethought himself of acquiring, on behalf of the municipality, the said statue, then undergoing completion in the studio of a Milanese artist. When the work was finished, the prince had gone out of office, and had to pay the 35,000 francs out of his own pocket. The treasure was wrapped up and placed in an inner court of the Doria palace; and when the prince, some years after, received permission to make certain alterations in the adjoining street, on payment of a sum of 50,000 lire or francs, he offered the statue in part settlement. The offer was accepted at cost price, namely, 35,000 lire, the remaining 15,000 in cash; but it is rumored that the authorities think they might have done better.

ENGLISH HOSPITAL AT PARIS. — The corner-stone of an hospital for the exclusive use of English people was lately laid at Paris. It is to contain forty beds.

BERLIN PNEUMATIC DESPATCH. — The proposed pneumatic despatch line in Berlin will have 26 kilometres of tube, and 15 initial stations. The wrought iron tubes have a clear breadth of 65 millimetres, and lie about one metre below the surface of the ground. The letters and cards which are to be forwarded have a prescribed size, and are enclosed in iron boxes, or cartridges, each of which can hold 20 letters or cards. In order that they may pack closely, they are covered with leather. From 10 to 15 cartridges are packed and forwarded at a time; behind the last cartridge is placed a box with a leather ruffle, in order to secure the best possible closure of the tube. At four of the stations are the machines and apparatus needed for the business. The forwarding of the boxes is effected either through compressed or rarefied air, or through a combination of the two. Steam-engines of about 12 horse power are used for the condensation or exhaustion of the air. Each main station has two engines, which drive a compressing and an exhausting apparatus, the steam for each engine being furnished by two boilers. Large reservoirs are employed both for the condensed and for the rarefied air. The former has a tension of about three atmospheres; the latter, of about 35 millimetres of mercury. The air, which is heated to 45° C. by the compression, is cooled again in double-walled cylinders which are surrounded by water. The velocity of the boxes averages 1,000 metres per minute, and a train is despatched every 15 minutes. Each of the two circuits is traversed in 20 minutes, including stoppages. The entire cost of the enterprise will be about 1,250,000 marks (about 300,000 dollars).

GERMAN CREMATION. — It appears to be a fact that the German society for the introduction of cremation has paid the sum of fifteen thousand marks to the town of Gotha, to cover the necessary expenses of erecting a cremation apparatus. Strict regulations have also been published by the police, ordering the examination by competent medical officers of all bodies submitted to be burned, so as to prevent cremation in all cases where the causes of death have not been properly ascertained. In order to still further guard against abuse, bodies sent to Gotha from abroad are to be subjected to the same or even more stringent rules, before being received for the operation. No corpse is to be burned unless the deceased has expressed a wish to that effect, and the relatives have approved.

STONE IMAGES ON EASTER ISLAND. — On one of the most remote islands of the Pacific — Easter Island — 2,000 miles from South America, 2,000 from the Marquesas, and more than 1,000 from the Gambier Islands, are found hundreds of gigantic stone images, now mostly in ruins, some 30 or 40 feet high, while some seem to have been much larger. The crowns on their heads, cut out of red stone, are sometimes 10 feet in diameter, while even the head and neck of one is said to have been 20 feet high. These once stood erect on extensive stone platforms, though the island has only an area of about 30 square miles, or considerably less than Jersey. Now as one of the smallest images — eight feet high — weighs four tons, the largest must weigh over 100 tons, if not much more; and the existence of such vast works implies a large population, abundance of food, and an established government. It is also maintained that this necessarily implies the power of regular communication with larger islands or a continent, and arts of navigation and civilization much higher than now exist in any part of the Pacific. Very similar remains in other islands scattered widely over the Pacific support this belief.

FIRE-PROOF PAPER. — Asbestos is found in large quantities in the valley of Aosta, in the Italian Alps. A priest of Arezzo, named Victoria del Corana, has experimented with it in the paper-mills of Tivoli, and is now making a fire-proof fabric at a cost of four francs per kilogramme. The most useful application which has yet been made of the paper is for the decorations of theatres.

GROUND-AIR AND THE DECAY OF THE DEAD. — There are burial-grounds in which a corpse decays completely in six to seven years, and others in which it takes twenty-five to thirty years. The regulations about a second occupation of a ground depend on this difference; and therefore towns with an equal population may be obliged to have burial-grounds of very different sizes. There are other circumstances of some influence on the process of decay, but the principal one is the amount of and the facility for the change of air in the soil. Rubble and sandy soils do the work much quicker than marl and clay soils. Striking experiences in this respect have been made on the French battle-fields, chiefly near Sedan, where a Belgian chemist, Louis Creature, had to disinfect the large dead-pits. The bodies were buried in chalk, quarry, rubble, sand, argillite, slate, marl, or clay soils, and the sad work lasted from the beginning of March to the end of June. In rubble the decay had taken place fully; but in clay the bodies were surprisingly well kept, even after a very long time, and even the features could be identified. As the processes of putrefaction and decay are intimately connected with the activity of certain low organisms which prey upon the dead, it is sufficiently clear that these organisms must thrive differently in different kinds of soil. A lively change of air and water in the ground appears to be of great influence in this respect; the more air in the ground, the richer the underground life. — *Popular Science Monthly.*

A TOMBSTONE. — A unique tombstone has been placed in the Yantic cemetery recently, to mark the grave of Mrs. David A. Wells. It is a boulder four feet in diameter, one side of which is faced, and bears the inscription, "And they rolled a stone to the mouth of the sepulchre."

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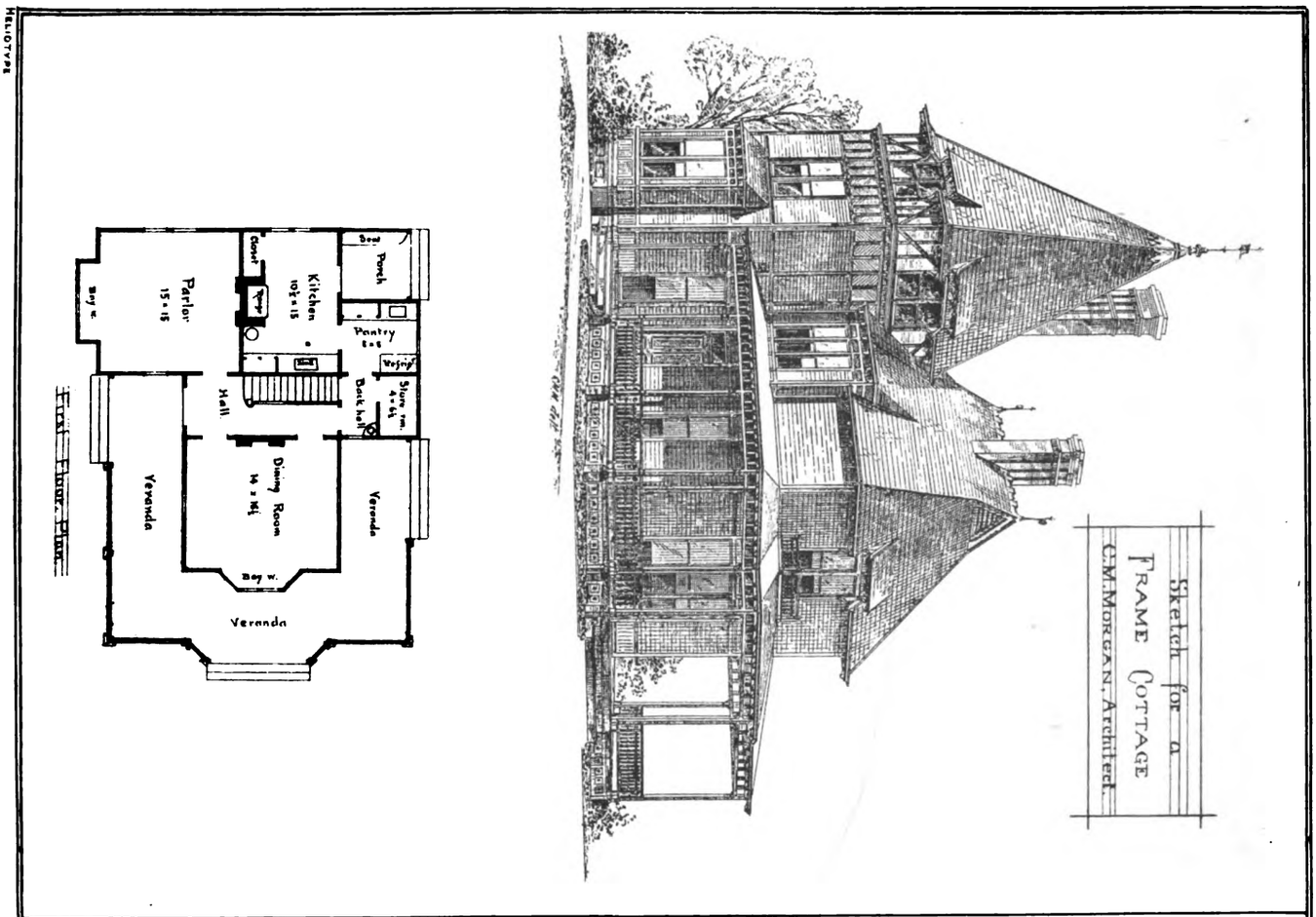

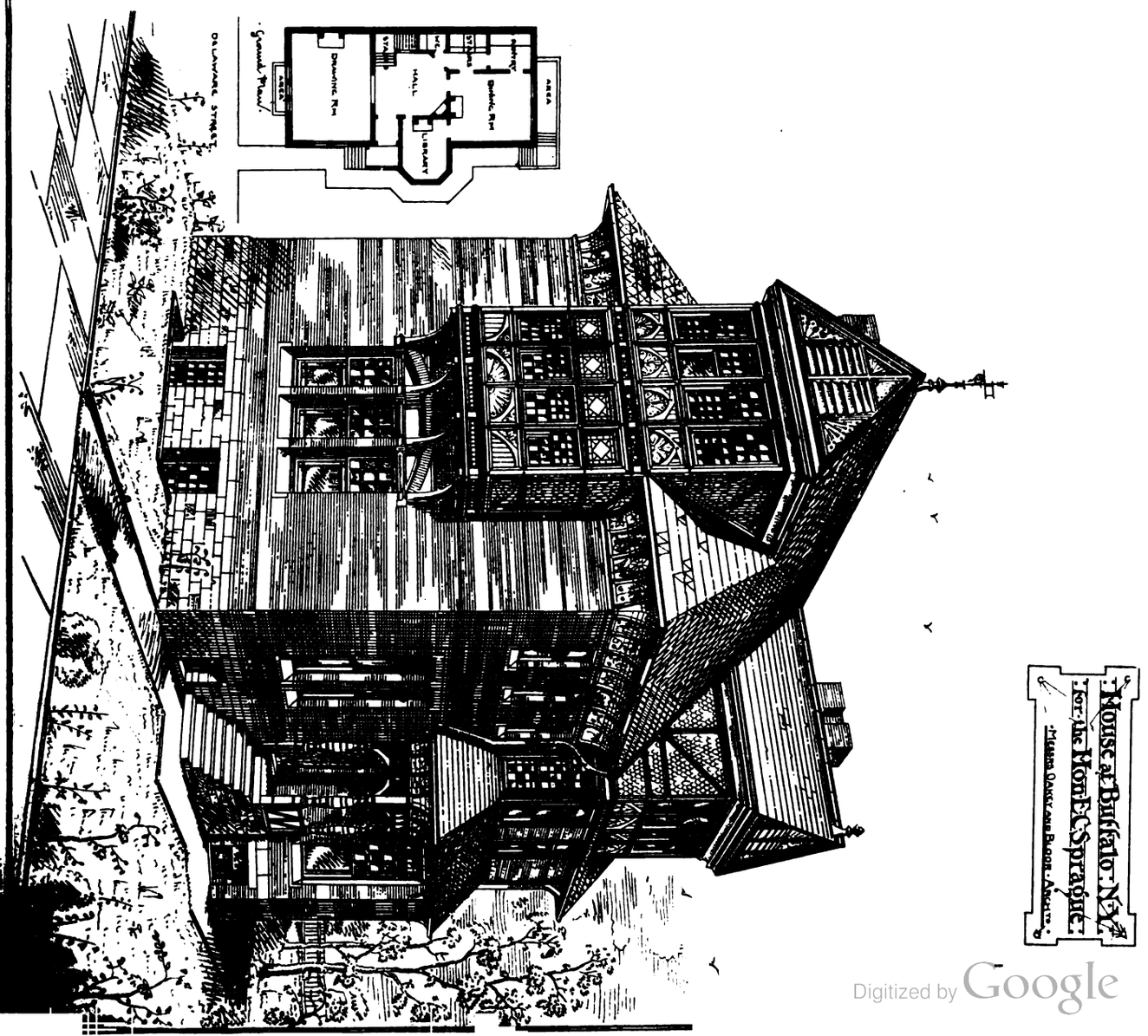

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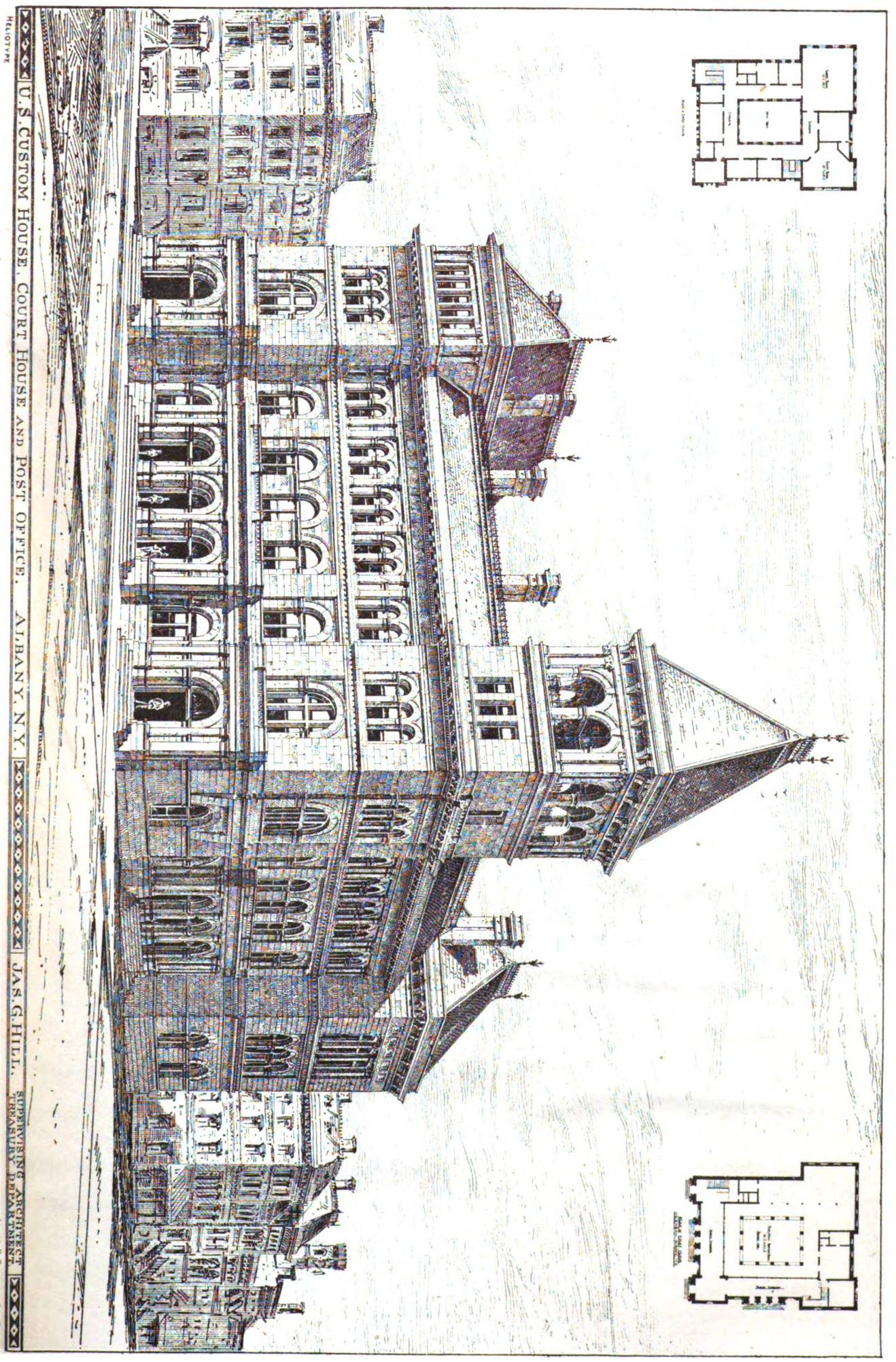

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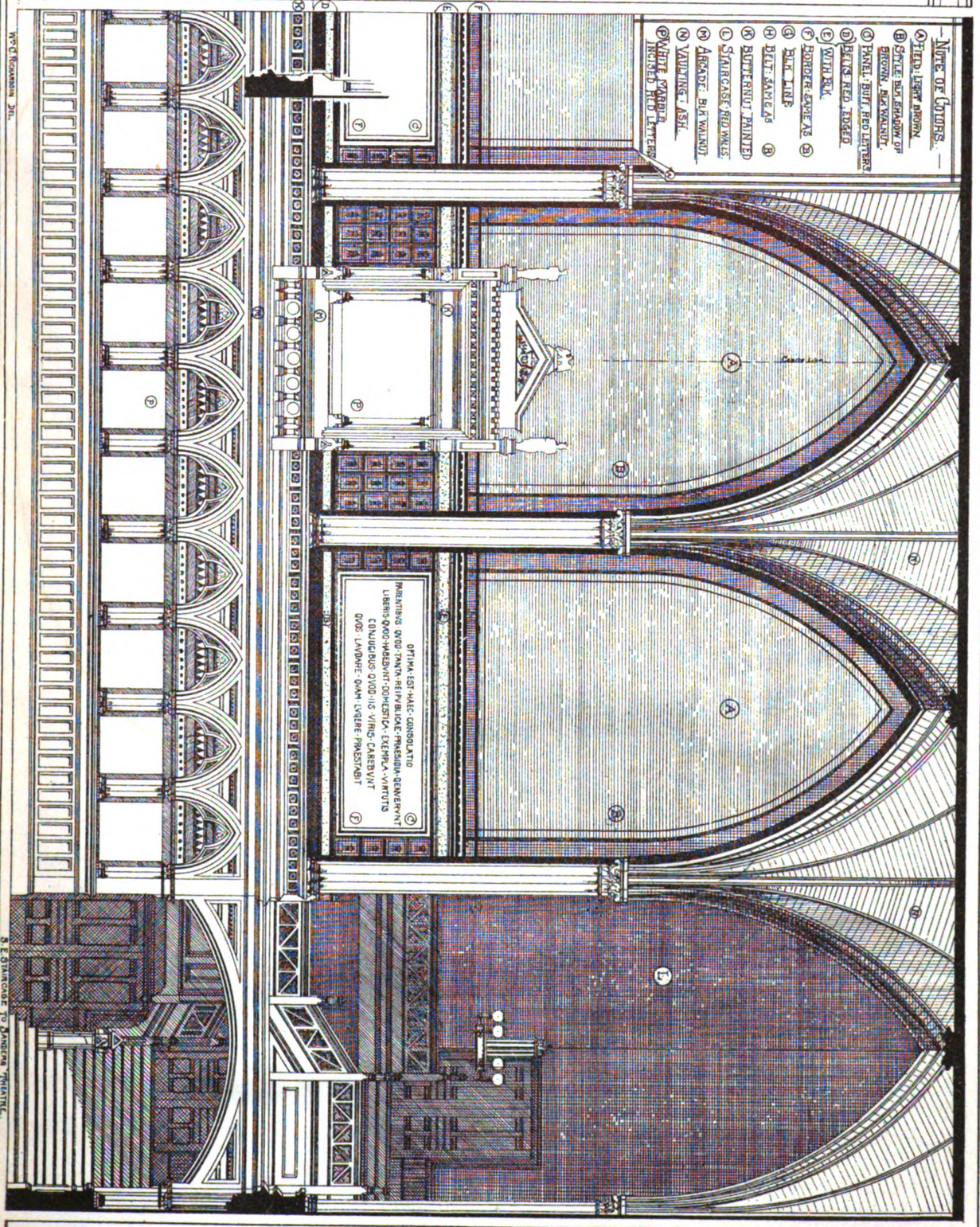
STUDIES OF INTERIOR DECORATION. PLATE X:

VESTIBULE OF MEMORIAL HALL OF HARVARD UNIVERSITY: CAMBRIDGE, MASS:

WARE & VAN BRUNT: ARCHTS:

LONGITUDINAL SECTION THROUGH THE MEMORIAL VESTIBULE LOOKING EASTWARD SHOWING THE TABLETS ON ONE SIDE OF THE HALL AND THE STAIRCASES TO SANDERS THEATRE:



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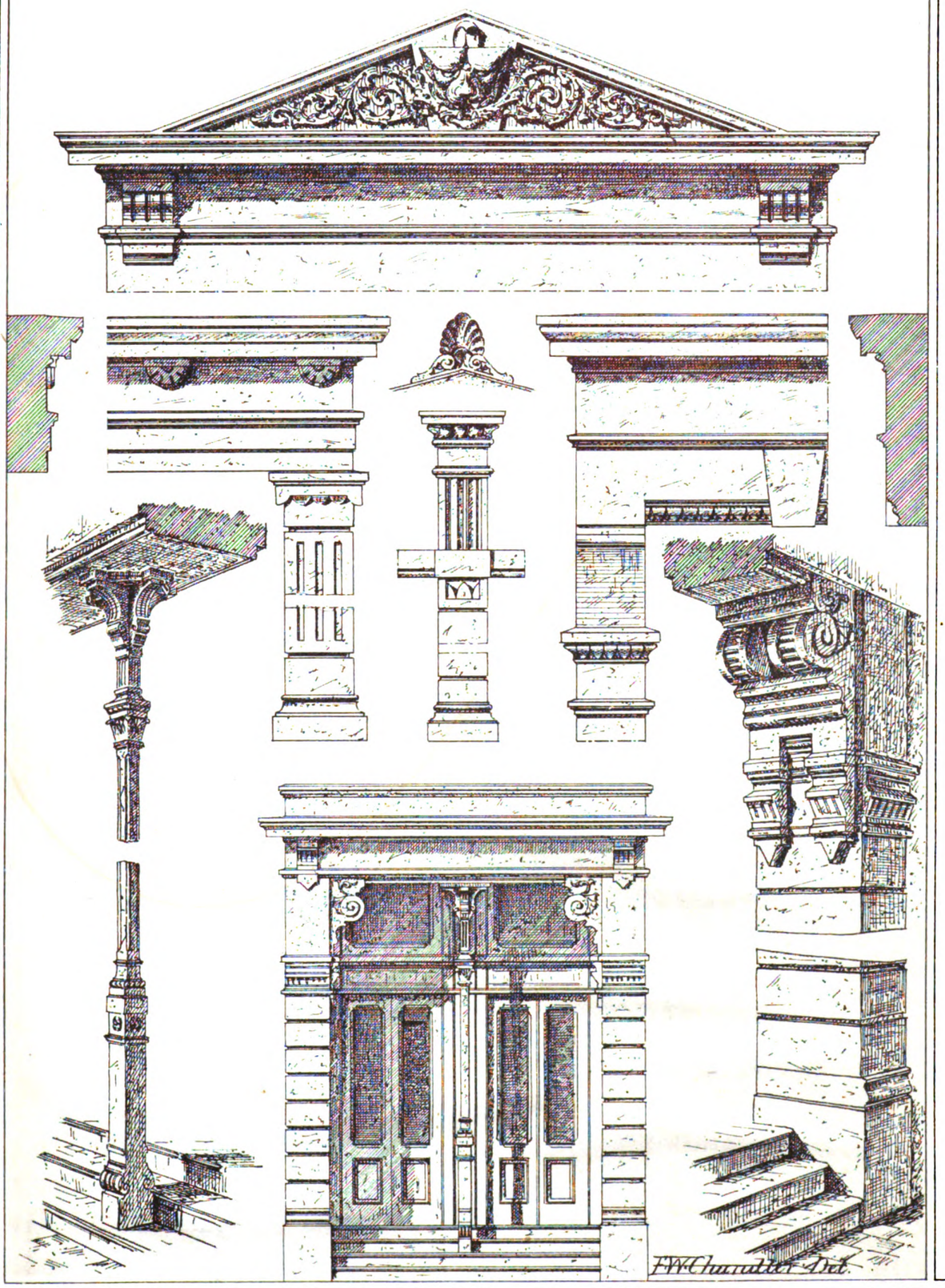

EMERSON AND FEHMER ARCHTS.

DETAILS OF STORES ON KINGSTON ST AND ON CHAUNCY AND SUMMER STS.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, JULY 21, 1877.

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THE time seems to have fully arrived for some prompt and decisive action to be taken by the architects of the country with reference to the Washington Monument. It now appears that the Board of Army Engineers, composed of Gens. Gillmore and Duane and Col. Kurtz, have reported to the Monument Association a scheme for such a strengthening of its foundations as will enable it to bear the whole four or five hundred feet of brutal and inexpressive mass according to the original design. We also learn that Gen. Meigs on the 5th inst. submitted to the Association a plan to terminate the present structure with a metallic spire 140 feet in height, making a total height of 315 feet and "resembling the tower in the Public Square of Vienna." The additional weight, it is said, would be 4,147,000 pounds. If it is St. Stephen's which is to be the prototype of this new development, the ecclesiastical German Gothic of the fifteenth century will hardly recognize itself in this queer disguise and in this new place, and will find itself put to strange uses in serving as a memorial to the American republican hero of the eighteenth. Another plan under consideration by the Association is that of Mr. Larkin G. Mead, who would place upon the colossal stump a statue of Washington, 85 feet in height, made of thin hammered metal. We would not speak lightly or without due respect either of the military engineer who would crown a bare truncated stone obelisk 175 feet high with a light metallic spire of inferior height, and dedicate the inexpressible combination to the Father of his Country as an object of art fitted by peculiar grace and purity of design to indicate the love and veneration of a great people; or of the sculptor who would finish the broken shaft with a figure 20 feet taller even than the "Bavaria" of Schwanthaler, which is obliged to be content with a pedestal only 30 feet high. But we venture to submit as architects and citizens — not as geniuses — that neither the original project nor its modifications, so far as we know them, should be presented to the world as the homage of the best American art to the best American patriotism.

WE most earnestly protest that the realization of any one of these schemes would more than counterbalance the reputation we have earned at Philadelphia, as a people striving bravely in the midst of strenuous toil for an expression in art worthy of our civilization. The building of this monument to Washington in the national capital is an undertaking so conspicuous and so deliberate that it will be accepted by the world as a type of our best progress. Let us compare this monstrous obelisk, so cheap to design but so costly to execute, so poor in thought but so ostentatious in size, or any of its known modifications, which we forbear to criticise because they cannot be seriously considered, — let us compare these with the works of art raised by other nations to commemorate their lesser Washingtons: the parallel certainly is startling. Our capacity to meet this emergency with at least a respectable show of art is patent to all. The propositions submitted are not representative; and we commend to the architects of the country — to the Trustees of the American Institute of Architects in particular — respectfully to urge the Monument Association to select some distinguished member or members of the profession to advise with them, or, with their assistance, to prepare a definite programme of requirements, with the necessary limitations carefully formulated, and open the whole subject anew to competition. The subject is one which, if properly presented, would call forth the best art which the country can produce, and the architects would respond to the call with an enthusiasm worthy of the theme. We venture to say that the Institute could readily prepare a scheme for such a competition consistent with the dignity of art and with the importance of the occasion, and equally acceptable to the committee and the profession. We believe the programme of requirements, in any such competition, need not necessarily exclude the recognition of the present unfinished monument as a basis on or around which the new work might be built as a completion of the original idea, though in a direction far different, we hope, from that intended by the author.

As nearly as we can remember, Mr. Winthrop's speech, delivered on laying the corner-stone of the National Monument to Washington, contained these eloquent words: "Build it to the skies — you cannot outreach the loftiness of his principles; found it upon the massive and eternal rock — you cannot make it more enduring than his fame; build it of the whitest Parian marble — you cannot make it purer than his life;" to which we venture to add, in the same strain: but build it as a work of engineering, and not as a work of art; build it without the most costly expenditure of human thought upon its outlines and of human love upon its detail — instead of honoring his memory you will insult it; instead of honoring yourselves in honoring him, civilization will reject your poor offering as far too poor to express the sentiments of a great people.

WE are tempted to exclaim, How slow are *all* English-speaking people to comprehend the true service which art can render them! Here is a typical case from the British Empire: Lord Lytton, Governor-general of India, has sent Capt. Cole, R.E., to England, on full pay, for eighteen months, that he may study architecture in order to be able to make a design for his new house at Simla. Meanwhile there are educated and experienced architects in India, who for want of employment, we are told, are obliged to turn railway contractors and builders to obtain a living. The English professional journals occasionally present us with designs erected by architects in India of sufficient merit to demand better recognition than this. This case would be unimportant if it were not representative. In France or Germany the culture of art rests upon a basis too broad and firm to allow such distrust of the artist. It is reserved for Anglo-Saxon governors and capital to distribute their art patronage among military engineers, female dilettanti, relatives in need, political supporters, and other dabblers in design, who rashly originate because they do not know what to copy, or badly copy because they cannot originate.

THE question as to the proper manner of decorating the interior of St. Paul's Cathedral has been revived, and is again a matter of discussion among the amateurs and critics of London. The subscription for this object now amounts to about $200,000. It will be remembered that the project of Mr. Burges, prepared under the direction of the committee three years ago, met with such general condemnation that it had to be abandoned. His proposition, as we remember it, involved a complete and very learned ecclesiastical iconography, covering the dome, the vaulting, and the upper part of the walls with a succession of pictures in encaustic or mosaic, assuming to set forth the complete celestial hierarchy, dominating over the typical personages of the Old and New Testaments, and over the holy army of saints, martyrs, and doctors connected with the history of the Christian Church; the piers and lower part of the walls he proposed to cover with a veneering of marbles in the Florentine manner. It seems, however, that Mr. Burges, in this very imposing composition, labored under the peculiar embarrassment, not only of his own strong Gothic predilec-

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tions, but of certain restrictions laid upon him by the committee; and it is probable that, under the circumstances, no other living architect would have had much better success. And now Mr. Edmund Oldfield, a member of "the executive committee for the completion of St. Paul's," dissatisfied that so far their labors have produced no practical result, writes a letter in the form of a treatise on the subject, to the Dean and Chapter, which appears unintentionally to explain how instructions emanating from a committee of conscientious amateurs may, in themselves, prove a serious obstacle to this great undertaking.

To instruct himself in his new duties, Mr. Oldfield, as we once stated (p. 10), has visited and examined many Renaissance churches in North Italy and Rome, and from these draws the conclusion that colored decorations should be divided into panels adjusted to the forms of the surfaces to be treated; an excellent result of his costly researches, but one which assuredly might have been more promptly reached by applying to the nearest competent architect. As to the practical application of the information thus laboriously obtained, he proposes, not of course to employ an architect or a competition of architects, but a competition of painters, who, however well selected, must, in the nature of the case, when turning to such a new field of thought, themselves act as amateurs under amateurs, and be subject to all the vicissitudes of inexperience. If there exists anywhere an art-education competent to deal with a subject so difficult and so unusual, it must be among those whose life has been spent in the study of architectural forms, and of the effect of color upon such forms. It is a subject requiring for its proper comprehension a life-discipline, such as the education of modern English painters has not furnished them withal. No civilized people, outside of the Anglo-Saxon race, need to be informed that proper architectural direction is the only guide which will lead to success in such undertakings. Not to recognize the architect in such an emergency, is an act of supreme Philistinism.

OUR country has enjoyed, and, as is now well recognized, hitherto mostly misused, unprecedented opportunities for the laying out and planning of new cities and towns. These, instead of following the usual course of municipal history in the Old World, and developing accidentally in various directions by slow accretions and imperceptible growths, have sprung into existence full-armed on a mathematical basis of uniform parallel streets, crossed generally at right angles by parallel avenues, without regard to considerations of aspect, the natural dispositions of surface, the geographical distribution of the land, and the location of public buildings. Sir Christopher Wren, after the London fire, seems to have been the first to give this subject scientific attention; and his well-known plan for the reconstruction of the city, involving the intelligent idea of streets radiating from great public centres where all the public buildings should be placed, if it had been carried out, would doubtless have gone far to make modern London the most beautiful city in the world. Some of the essential features of this idea are contained in the plan of the city of Washington, which subordinates to a certain extent the direction of the streets to the locations of the principal monuments. But the Department of Parks in the city of New York, which has been intrusted with the preparation of a plan for the laying out of the beautiful suburbs north of Manhattan Island, viz., Morrisania, West Farms, and Kingsbury, which have lately been included within the municipal limits, seems to have recognized several points which up to this time have not had their due influence in the laying out of towns. It has submitted a scheme for such an enlargement of the city in this direction as shall properly avail itself of all the agreeable diversities of surface, the natural highlands being reserved for dwellings, and the more level regions bordering the Harlem and Hudson Rivers, and in the vicinity of the great railways running north and east from the metropolis, being set apart for traffic and manufactories. According to this system, the streets adjust themselves to the surfaces by curves and picturesque windings, admirably adapted to the most effective display of architecture and to the most rational drainage, avoiding steep grades anywhere, and any grade where traffic is likely to encumber them. The scheme also contemplates what appears to be a very admirable extension of the rapid-transit system of New York, by means of which these new outlying wards will be rendered easily accessible from the present centres of business. This project seems to be consistent not only with the demands of health, convenience, and art, but of economy also, for it avoids that indiscriminate levelling and costly grading of surfaces by which the natural beauty of our towns has been diminished, and their natural debt materially increased.

THE NATURE OF AN ARCHITECT'S COMPENSATION.

WHEREVER the architect's profession is new, or where its customs are not clearly understood, there is apt to be a good deal of quarrelling about his proper compensation. In our own country especially, in the rawness of the profession, clients fail to see the meaning and reason of their architects' reasonable charges; and even architects, from having neglected to examine the usage on which they are based, are sometimes unable to give a satisfactory warrant for them. These difficulties come oftenest from a confusion of an architect's relation to his client with other more purely commercial relations, and from the disposition to apply to his work methods of payment which belong to other kinds of work which are more familiar.

The architect's payment might of course be based on some computation of the amount of work he does, on the time his work takes, for instance; that is, he might be paid wages. Or he might be paid on the commercial principle of a tax or commission on the cost of each of the various items of material and labor which pass under his supervision. This is the principle on which it is very commonly taken for granted that he is to be paid; but, as will presently appear, it is not that which is at the bottom of the existing usage, although the rough method of compensation which is adopted seems to imply it, and thereby leads many persons into a wrong view of the case. To apply either of these principles with the precision which alone would justify making them the rule of compensation, would involve a system of charges very minute and of laborious application as well as difficult to adjust, so much so as probably to prove impracticable for common use, and at any rate very different from that which is actually employed.

According to the system of payment which has grown up throughout Christendom, and which is substantially the same in the usage of all the countries where architecture is established as a profession, the architect's compensation is grounded, like that of a lawyer or a salaried official, not on computation of the amount of work he performs, nor on an exact account of the materials and labor over which he has charge, but on a general estimate of the value of his service to his employer. The system of percentages is used merely as a rough but convenient method of estimating the importance of this service. He stands in the position of a confidential agent who undertakes a certain important charge, fixing the price of his services according to its apparent importance, and assuming the risk himself of the amount of labor it will require of him, — an amount which, in its proportion to the amount of his fee, varies widely in different cases. This is the principle on which all salaried persons are paid, — clergymen, clerks, public officials, for example, — only, since the position of an architect is not permanent nor periodical, his payment is not a yearly or monthly stipend, but a sum which is determined by an estimate of the importance of the piece of work for which he is engaged. We took some pains to illustrate in our last editorial the peculiar and confidential nature of an architect's duty to his client. One of our objects in doing so was to show how, by common instinct as it were, the nature of his recompense is adapted to it, and how both are distinguished in kind from the service and the recompense of a commercial relation.

It has been concluded, from the experience of several generations in various countries, that one-twentieth of the cost of a building is in ordinary cases a fair allowance for the importance of the service of planning, designing, and supervising it, and that though the labor involved is quite irregularly proportioned to this compensation, yet in the long average the practitioner gets reasonably rewarded. There are particular kinds of work, to be sure, for which this fee of one-

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twentieth the cost is obviously insufficient. Such are the designing of inside finish, furniture, or other decorative or monumental work, or of repairs to old buildings. When this service occurs, not as part of a general charge in which it is to be included, but as a thing to be separately accounted for, it is usual to expect a fee of from ten to fifteen per cent; but this exception only confirms the accepted understanding of the usual fee, which is a round sum for a round service, and is understood to be computed upon the whole cost of the work, every item included, up to the time when the architect's connection with it ceases.

Many people look with an instinctive preference for a plan that will adapt the compensation more directly to the labor performed, and there is a common idea that such a system would be more rational. But of the labor in this case, as we have said, it is very difficult to make any tolerably accurate computation, complicated and various as it is: it would be still more difficult to exhibit it in any way that would satisfy the exigence of a suspicious client; but of the importance of it there is a tolerably exact and an easily applied and indisputable measure, in its cost. Without stopping to go farther into the pros and cons of this method or another, it is enough to say that in a large view of the public convenience the chief desideratum is some system of payment which, while it on the whole allows a substantial equivalent for the service rendered, shall be of easy application, not inconveniently complicated, nor dependent on elaborate compensations which the client cannot follow out and justify, but clearly understood by him, and reducing the occasions for bickering as much as possible. Such a system is that which actually obtains, of payment by a gross percentage, fixing a round sum based upon data in the client's own possession, suiting with the confidential and necessarily rather undefinable nature of the architect's service, and not attempting to take accurate account of the multitude of small labors into which it would be difficult for him to enter, and impossible for the client to follow him.

The sum is, we say, a round one, meant to cover on the whole the entire service rendered, but not to be separated, except in certain largely defined divisions, into parts corresponding to the various labors that make up the service. For convenience in the cases where the architect may have occasion to stop his work at certain conspicuous points, his five per cent is divided into parts assigned to its chief stages: one per cent for preliminary sketches, two and one-half per cent when full plans and specifications are made, three and a half with full detailed drawings, and five with superintendence. But these, like the whole fee, are gross sums estimated for convenience' sake and not for accuracy of compensation. The whole fee is not understood — and here is the key to a good many misconceptions — to be made up of small sums corresponding to the various acts of service or the parts of the work on which it is computed. The whole five per cent does not at all mean five per cent on the cellar, five per cent on the walls, five per cent each on the roof and the outside finish, on the doors and the chimney-pieces, on the stairs and wainscoting, on the stone, the brick, the timber, and the mortar. All these items must be counted in to get at the cost of the house, and so estimate the importance of the duty performed and its recompense; but to assign each part its proportional share of the compensation is entirely beside the mark. If this were to be done, an elaborate and varied scale of compensation would have to be arranged. The cellar and walls might not call for more than two per cent; the chimney-pieces and the stairs ought to have as much as fifteen. Twenty-five dollars, for instance, would be a ridiculous compensation for the designing and drawing of a staircase that cost five hundred; and there are certain kinds of work which it absolutely costs more to design than to execute. Or for the rough materials and coarse work for which a comparatively rapid inspection is sufficient, a small fee would be adequate; while the work of finishing, and certain critical mechanical operations which require very careful watching and minute directions, would call for a much larger one. That the fee is not susceptible of such subdivision is clear, even from the way the various payments for the different stages of the work are assigned. Thus when two and one-half per cent is assigned for general drawings and specifications, the mass of the work, its body and substance, is provided for. The making of detailed drawings, for which one per cent is allowed, is almost confined to designing minutely the outside and inside finish; and for the work done on these, ten or twelve per cent on their cost, which is often not a great part of that of the building, would not be too much. But the percentage is levied on the whole house, as much on the parts that have been substantially provided for by the general plans, as on those for which the details are a special study; and the small rate levied on a large amount of work with most of which the immediate service has really nothing at all to do is expected to give in the average an equivalent for the labor required.

From these general principles on which the architect's compensation is grounded, there follow certain inferences which are to many persons very unexpected, and which, from want of consideration, are often vehemently disputed. Since it is his duty simply to undertake the general responsibility and whatever labor may be required in designing and overseeing a building, and to take his pay in a sum computed on the whole cost, that is, the whole value, of the house, it makes no difference whatever whether he has actually expended labor on all the individual items that enter into its cost or not, nor whether all of the materials used have been provided for that express purpose or not. Some clients take it for granted that in summing up the cost for computing the architect's commission, if there is any thing in their buildings which was not of his design, or did not pass under his direct supervision, it should be omitted in the computation. If, for instance, the proprietor has selected a furnace or a range, or picked out a chimney-piece to insert, or ordered gas fixtures, or one and another small alteration, of his own motion; or if from personal interest or preference he chooses to perform himself some of the details of the architect's duties, these things do not exempt any thing from computation, or alter the general bearing of the professional claim. The architect has assumed to furnish all the labor the case requires, be it more or less: the client, on his part, has undertaken to pay him according to the value of his house. It is not in the understanding that the architect should shirk any unexpected care that the work may lay upon him, nor that his client should take advantage of any particular point at which his services may not have been required to abate his compensation, which is general and not particular. In the same way, if the client has already in his possession material which he uses in the architect's design, and for which, therefore, he pays nothing in connection with his building — if he makes his own brick or has his own lumber on hand — the value of these must be counted in computing the fee. For the architect is not paid a separate commission on the purchase of the materials used in the building; and the fact that the proprietor has them on hand takes nothing from the value of his whole service, nor even from his labor. It would be obviously unfair, in fact, if a brick-maker or a carpenter, by virtue of having materials on hand, could command the services of an architect at a less price than another person. There is good reason for saying, indeed, that the term "architect's commission" is a misnomer which produces misunderstanding and trouble, and that it would be better that his compensation were called by another name. It is not a commission at all in the ordinary business sense; that is, it is not a toll levied on the various items of material and labor which enter into his work. It is merely a definite fraction of a gross amount; and the items are accounted not for their significance as items, but merely as a means of getting at the gross amount. It would be well, we think, if this misleading name could be given up, since it carries in common business parlance a meaning which is at variance with the real nature of the compensation, and "fee," or some other unequivocal term, be substituted.

We are not here, be it understood, pleading the cause of one system of payment against another. We have incidentally mentioned some of the considerations which commend the existing system; and there are others, which it may be well to suggest at another time. We have aimed simply to illustrate its nature, and to point out one or two of the misunderstandings to which it has been subjected, because it is the existing one, — a better one on the whole, we think, than any of the substitutes that have been suggested, but, at all events, the only one that does exist, the world over. It is the one that is explained in the circular of the American Institute which we had occasion to print a few weeks ago (No. 75). It is the one recorded in the official announce-

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ments of European architectural societies. It is sustained by the decisions of many European courts, and doubtless American ones, though unfortunately American decisions in architectural disputes have seldom been put on the official records. It is not the only possible system, nor the only one that has been advocated; but it is the only one which usage has established. In our opinion, it is better than any substitute that has been suggested; at any rate, it has the advantage of being simple, clear, easily understood and applied by the client who makes the payment, and when once comprehended, as little liable to dispute in its application as any system is likely to be.

STUDIES OF INTERIOR DECORATION.

XIII.

IN our previous study we indicated by a monumental example how a purely architectural effect on a comparatively large scale is to be obtained by the use of color: in other words, we presented a problem of architecture in which color was used not merely as a decoration, — not merely as an explanation or supplement of the form, — but as an indispensable necessity of the design.

Perhaps our readers scarcely need to be reminded that in every great era, form and color have been considered equally essential to expression in art. The Greek of antiquity, to whom we instinctively refer for instruction, refined the details of that simple combination of posts and lintels which constituted his buildings, until finally he reached a point of perfection beyond which his perceptions apparently could not carry him. He was thus enabled in a manner to establish a formula, a model, a standard of pure architecture, which, in his mind, had the force of a law; and it was called an *order*. But when he discovered that his order, in certain effects of light and at certain distances, lost its purity of expression; when he saw that the shadows thrown by his columns upon the wall of the *cella* behind were strong enough to confuse his peristyle, and those thrown by his cornice, to overcome the precious details of his frieze, — he found it necessary to revive the traditions of earlier forms of art, and to complete his form with color for the sake of securing and maintaining the perfection of his architectural thought under all circumstances.

Therefore he painted the wall behind his colonnade with a dark red, in which his columns nearly lost their shadows, and against which their form was sharply defined; and he separated his metopes from his triglyphs by a treatment of positive red and blue respectively, so that the shadow of his cornice could conceal no detail essential to the design. In like manner, he drew certain horizontal lines of buff on the red wall behind his peristyle, to recall the effect of masonry, and by contrast of direction to enhance the vertical effect of his fluted shafts; or he divided the red wall into panels with rich styles of green, brown, or black, and, with his simple scale of color, so treated the minor details of his entablature as to intensify the expression of their several functions, to prevent the masses of color from predominating over the proper effect of form, and by recurrence in lines upon fillets, or in small broken quantities upon mouldings, to soften the transition between the applied colors and the natural whiteness of the marble.

It is certain, also, that the Greek set the statue of the god within the temple against a background very highly enriched with decorative and subject painting. It would be useless here to recapitulate the proofs gathered together by Hittorff in support of this proposition. They are sufficiently numerous and sufficiently strong to leave no question of doubt upon this point. Indeed, without proof by example, it is evident that architectural effects dependent on modelling by reflected or diffused light, as in interiors, must receive even more efficient aid from color than on the exterior, where they have all the obvious advantages of direct light.

Modern critics were not prone to accept the idea of polychromy as applied to Greek architecture, because they could not appreciate its necessity. But the fact is no longer to be disputed; and whether we can appreciate its meaning or not, whether in this the Greeks followed their ancient traditions, as Hittorff implies, or proceeded by invention to fulfil a necessity of design, as Viollet-le-Duc conjectures, we must needs accept it, not as a mere superfluous decoration, but as *a completion of the architecture*. To the Greeks art in all its forms was a matter far too serious to be trifled with. The very essence of the Greek spirit was deliberation, reserve, and self-denial. It is impossible, therefore, for any one who, by study, has made himself familiar with those characteristics, to conceive of Greek architecture of the purest time admitting any form of caprice, whether of shape or color.

In like manner the lay architects of the thirteenth century found that their interiors, although illuminated with many-hued light from their painted windows (or perhaps because so illuminated), required the element of applied color to define their details and obtain the full value of their architectural forms. The mediæval theory and practice, in this respect, both as regards ecclesiastic and domestic interiors, are set forth at great length by M. Viollet-le-Duc in his article *Peinture*, in the *Dictionnaire Raisonné*. Indeed, as to this subject, we are aware of no more competent authority, no more lucid or exhaustive exposition.

"Of all the appliances essential to the production of architectural effects, decorative painting," he says, "is especially difficult, because of the impossibility of laying down general rules in regard to it equally applicable to all the emergencies of design. But practically it is certain that according to the manner in which it is used in a room, it can alter or define its constructional proportions, can enlarge or belittle, illuminate or obscure it; by this agency its details may be brought near to the eye or be indefinitely removed, separated or combined; if it has faults, color can conceal or exaggerate them; its columns may be lengthened or shortened, attenuated or enlarged; its ceilings may be raised or lowered, its wall surfaces extended or diminished. Decorative painting, in short, is a spirit, prodigal of good or evil, — never indifferent; it can soothe or excite, delight or offend; it can give an impression of unity and symmetry, or it can distract the eye with a contention of useless detail. With a stroke of the brush it can destroy an architectural idea, however skilfully set forth, or convert the rudest cabin into an object of art; it can render a room, however cold or bare originally, a place which the soul can inhabit with comfort and remember with delight."

An art so sensitive as this, capable of such prodigious effects, an art so "prodigal of good or evil, — *never indifferent*," — cannot be safely committed to unskilful hands. Every architectural work, whether large or small, public or private, ultimately requires for its full expression the aid of color; if not without, certainly within. This color is either constructional, i.e., made by the combination and contrast of the various materials used in building, — stones, marbles, wainscotings of various woods in their natural colors, — or applied in wall-hangings of stuffs or paper, in tiles, carpets, parquetry, stained glass, and paint; or constructional and applied color may be combined. But, however used, it is not a part of design to be subjected to caprice or whim. It should not be an after-thought or a secondary consideration, as is usually the case nor, if it is possible to avoid it, should it be considered a mere matter of convenience and furnishing, in the which one person may be regarded as good a judge as another. For, let us repeat, interior decorations are the completion of the architectural idea, and are always to be seriously considered by the architect; if neglected or under-rated by him, they will sooner or later, in indifferent hands, make his work ridiculous, will counteract or cancel his studied effects, or at least so misinterpret them that his labors as an artist will have been in vain.

To point this moral, let us now, turning from monumental examples, consider in Plate XI. a domestic subject, in which, if anywhere in such work, the lines of architecture or construction might be considered sufficient in themselves to produce a complete effect of design. This is the staircase hall of a country house lately erected. It is entered from the rear of the spectator, and is lighted by an oriel opposite on the broad landing of the stairs, as shown. This oriel is composed of four windows on the end wall looking towards the north, and one on each return wall east and west. each window having a border of stained glass, and, in a transom window over, a figure-subject in glass of rich low tones. This oriel commands a view of lake and woodland. Mirrors occupy the central bay of the oriel, corresponding with the windows; and the landing is furnished with chairs, table, and rugs, like a room. Beneath the landing is a chimney corner entirely enclosed in wainscoting, with a very wide arched fireplace in red brick, lighted on the east by a square casement and on the west by a corresponding light in a door opening on a veranda; these openings are filled with small quarries of stained glass, each containing a separate subject in outline. The hall has an open-timber roof, and the end opposite the oriel is occupied by the corridor, giving access to the principal rooms of the second floor, and is crossed by a gallery on the level of the third floor overlooking the hall. There is a panelled dado, and this, together with all the rest of the wood-work, is of black walnut; the walls are plastered, and the floors are laid with narrow strips of ash bordered with black walnut.

It will be observed that, to the guest on entering, the proper effect of this hall is endangered by the flood of light from the oriel, which naturally blinds his eyes, and in great part blots out, as it were, all the architectural details. Now, as we have already had occasion to note, a very important point to be observed in the treatment of every room is that, however rich and various its appointments may be, its general intention, the mutual relations of its principal parts, should be thoroughly understood at first view. In the study of this design, therefore, it is necessary for us to use every expedient to mitigate this confusion of light. The stained glass of course does a great deal and very effectively to accomplish this object, but the white plastered wall still remains to multiply the evil. It is evident therefore that these walls must be so covered as to absorb the rays as much as possible. To this end they must evidently be dark, — darker even than the black walnut, or else the outlines of the wood-work will not be properly relieved against it. If they are lighter than the black walnut, they will not be sufficiently absorbent; if they are not neutral in tone, they will embarrass us when we come to consider the wall-treatment of the adjoining rooms, by suggesting inconvenient and inappropriate competitions or contrasts; if the color of the walls in question is not broken by detail,

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they will be monotonous and oppressive, as their expanse is great; if we break them by cutting them up into large architectural panels and styles carefully adjusted to illustrate the lines of construction, this treatment will be found too formal and monumental for domestic use, and will impose inconvenient restrictions as to the hanging of pictures.

By this reasoning we discover that these walls must be very dark, very neutral, and covered with equally-distributed detail. This of course suggests a wall-paper, and the one chosen meets the conditions with a ground of positive black, overlaid with reticulations of dark olive lines crossing each other at right angles, thus forming three-inch squares; and these in turn are covered by a layer of stiff open leafage, with rosettes all in brown-red. The drawing pretends to present the comparative scale of this surface detail, but the value of it in color relative to the wood-work of the staircase and of the wainscoting, cannot of course be fairly given in black and white. This treatment, however, serves in great measure to counterbalance the glare of the oriel, and to enhance the decorations of the glass. The result is a busy richness and soberness of effect obtained by the combination of the wall treatment, as above described, with pictures, carved furniture, rugs, and *portières;* so that the main office of the hall, which is to afford a hospitable welcome, and to introduce us to other rooms, is performed in a manner not to neutralize or compete with their brighter and more lively effects.

The roof panels are painted with a greenish-olive background, like the lines in the paper, offset by styles composed of a darker tone of the same olive, enforced with black, buff, and red lines.

If in discussing this room, we have made it clear that its architectural effect is *saved* by the color-treatment of its walls, the object of introducing this illustration is attained.

THE ILLUSTRATIONS.

✓ TOWN HALL, COMPIÈGNE, FRANCE.

THIS illustration is taken from the *Encyclopédie d'Architecture.*

The Hôtel de Ville at Compiègne, which M. Viollet-le-Duc styles "the most complete and most remarkable" of all the town-halls of France, dates from the sixteenth century. It consists of a single main building which has a grand spiral staircase, crowned by a fine belfry. On three stories large halls open to the right and left of this staircase. The large niche above the doorway is filled by an equestrian statue of Louis XII. Two projecting watch-towers flank the angles of the building, — an arrangement which was adopted for the Hôtel de Ville at Paris, which was built during the sixteenth century, and finished under Henry IV. The town-halls of the North always had a projecting balcony whence the people could be harangued; but at Compiègne this balcony is merely a little recess at the base of the belfry, at the level of the balustrade at the eaves.

ROBERTS VILLA, XENIA, O. MR. E. ANDERSON, ARCHITECT.

✓ (160 West Fourth Street, Cincinnati, O.)

This house is built of cherry red bricks with Ohio freestone finish, and Dayton or white limestone up to the level of first floor. All the interior finish is to be of hard woods.

✓ STUDIES OF INTERIOR DECORATION, — PLATE XI.

See article above upon this subject.

THE NEW VILLAGE SEWERAGE AT LENOX.

THE sewerage works at Lenox, Mass., to which reference has already been made in these columns, and which have been constructed under the direction of G. E. Waring, jun., sanitary engineer, Newport, R.I., have been completed and put in operation within a few weeks. So far as can now be determined, they are capitally adapted for their purpose, and are working perfectly.

Lenox is a small village whose population is considerably scattered, and is without any natural outlet for its sewerage. The only course by which the sewage could have been carried away by gravitation, and prevented from being a nuisance, would have been by cutting a deep channel through a rocky ledge and continuing the outlet some three miles to the Housatonic River, which would have involved an immense outlay.

The fund for the work was made up in part by contribution from the town, and largely by private subscription. It amounted to about fourteen thousand dollars, which would have been quite inadequate for the outlet above referred to, to say nothing of the sewers in the streets. The soil of the village is heavy, and in places quite wet. As far as surface water rain-fall is concerned there was no justifying occasion for expensive artificial works. As in the case of so many villages, all that was essential was to provide for the safe and complete removal of the liquid wastes of households.

Under these conditions, — the usual conditions of country villages and small towns, — it was determined to furnish sewerage accommodation for the liquid house-wastes only, carrying to the sewers such roof-water from churches and other buildings as would serve for their complete flushing. The fall of the sewers is in all cases such that six-inch pipes have ample capacity for the service required; and all of the sewers, including the main outlet, are of this size. They are made of Akron pipe, well provided with gaskets, and thoroughly cemented. As the village is amply supplied with water, it is intended to flush the sewers from time to time by a four-inch hose inserted into them at points near the fire-plugs. There are frequent man-holes with ventilating covers. The general depth of the sewers is five feet below the level of the streets, which gives sufficient drainage to the basements of all houses. As a means for relieving the soil of undue moisture, a common land drain is laid at the side of the sewer-pipe at the bottom of the same trench, — these land drains being at proper intervals turned into the sewer. Thus the soil-drainage water aids in keeping the sewers clean, and the sewers furnish an ample outlet for this at all times.

That which makes this system chiefly worthy of notice is the means adopted for the final disposal of the sewage. As before stated, there is no good natural outlet by which it may be discharged into a running stream. To have carried it to a point where it could be used for surface irrigation without the suggestion of objection to residents, would have been expensive and difficult.

To meet the requirements of the case, the "flush-tank" invented by Mr. Rogers Fields, an English engineer, and the system of sub-irrigation pipes suggested by the Rev. Henry Moule, the inventor of the earth-closet, have been applied on a scale commensurate with the needs of the case, — a much larger scale than has been adopted heretofore either here or abroad.

Simply stated, the arrangement is as follows: —

The sewage is discharged into an underground reservoir or tank, having a capacity of about four thousand gallons. The outlet to this tank is by means of a siphon so arranged that it shall come into action automatically whenever the tank is filled. The discharge through this siphon is very rapid, — the whole tank containing more than a day's supply being emptied in less than thirty minutes. Being empty, air enters the siphon, and there is no further discharge until the tank is again filled. The discharged liquid is delivered into a series of underground lines of common land drain pipes, with uncemented joints, having an aggregate length of ten thousand feet and lying twelve inches below the surface. The liquid discharge from the tank flows rapidly into these, and is nearly sufficient to fill them. It soon leaks out at the joints, and is absorbed by the soil, which retains its organic matter until oxidized and appropriated by the roots of grass.

As a precaution for use during repairs, or in the event of the absorption drains being obstructed by frost, arrangements are made for diverting the flow, and delivering it temporarily on the surface of the ground. In like manner, should it become necessary, the flow from the village itself may be turned directly on to the surface. In either case the surface flow is received in a horizontal irrigation gutter, which will serve to spread it over the whole field occupied by the absorption drains, — about 1½ acres.

It may be of some interest to village authorities to know that while any system of natural outflow that could have been adopted would have brought the cost of the work to over $20,000, the cost of the Lenox work with all its appurtenances has been less than $10,000.

LIGHTNING PROTECTION.

THIS book has been compiled to advertise a device for the ground end of a lightning-rod.

It has a certain air of being a treatise, which we understand to be a systematic arrangement of known truths; but the original material employed to lace this patchwork together is full of error. The reader ought not, in acquiring useful information on the subject of lightning-rods, to be exposed to the danger of imbibing vagaries in meteorological science, — or in any other. What excuse can there be for speaking of "the *subterranean water-bed,*" as if the globe were a shell, and universal water were a layer at no great distance within?

What does the author mean by saying that "silent electric discharges between the air and earth are capable of *forming nitrogen,* which is essential to the growth of vegetation and plants" (*sic*)? or, that "ozone is air holding a double portion of oxygen in its composition"?

Despite all this, and much more of the sort which the book before us contains, it may fairly be said to state, in a way to interest the reader, the general doctrines of electricity as applicable to house protection from lightning. It clears away (and this is a service entitled to thanks), a good deal of mystery which lightning-rod men have helped to make needlessly dark. The substance of the book may be summed up in the following propositions: —

1st, That glass insulators are unnecessary, and gilding or silvering the tips of the rods does not improve their serviceability.

2d, That the round bar or rod of iron designed by Dr. Franklin is as good a lightning-conductor as any of the copper or composite rods of modern introduction.

[1] A Practical Treatise on Lightning Protection, by Henry W. Spang. Published by Claxton, Remsen, & Haffelfinger, Philadelphia, 1877.

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3d, That the area of protection of the lightning-rod at the surface of the earth will be swept by a radius equal to about one and a half times the height of the tip of the lightning-rod above the ground.

4th, That the rod should communicate with moist earth; and that this may be conveniently effected by driving to adequate depth a perforated iron water-pipe, which is connected with the lower end of the lightning-rod, into the soil where the water from the rain pipe discharging from the eaves-trough is received, and soaks away into the ground.

In the matter of this perforated iron tube or hollow prolongation of the lightning-rod to permanently moist earth, the author thinks an improvement has been made, and it seems reasonable.

The tube will facilitate the absorption of the gathered water from the eaves-trough, and, by conducting it to depths from which it will not so readily escape by evaporation, will prolong the continuance of a wet column of earth.

MORE BRIBERY.

[The following letter, which explains itself, has been forwarded to us for publication. We are greatly surprised that such a letter should come from the quarter it does. The profession would be glad to know, and so would their clients, we fancy, by what authority Messrs. Cornelius & Co. speak of a "usual commission" on orders received through architects.]

PHILADELPHIA, June 29, 1877.

—— ——, *Esq., Architect.*

Dear Sir, — We take the liberty to write you requesting information concerning the completion of the fine residence you are building for a gentleman in ——. It will afford us pleasure to furnish you with special designs in gas-fixtures for the above, or for any other buildings you may have in hand. We have a very fine line of the Eastlake polished brass patterns, also polished brass and majolica, and have recently furnished some of the very finest residences and public buildings in the country. We will allow you the usual commission of ten per cent on all orders received through architects.

Yours truly,

CORNELIUS & CO., *per Patterson.*

CORRESPONDENCE.

QUARTERLY REPORT OF THE SUPERINTENDENT OF BUILDINGS. — WORK IN THE OFFICES.

NEW YORK.

THE report from the building department for the quarter ending June 30 tells a tale of great reduction as compared with the corresponding quarter last year. The figures are based upon the estimated cost of the proposed buildings, such estimates of cost being made by the architect or owner, and accepted by the department. While some may under-estimate, the tendency in all building operations to overrun the estimates will make the figures fairly representative of the actual outlay. The number of plans offered for inspection during the quarter was 276, embracing a total of 495 separate buildings. Of the plans 241 were approved on first examination, 14 were sent back for amendment and subsequently passed, and 21 were rejected outright. The estimated cost of the projected buildings was $5,438,875. During the quarter 499 new buildings were commenced, and 331 completed; and there were in progress in the city on the closing day of the quarter, 788 buildings.

In the matter of alterations there have been some important changes made. The number of plans submitted was 425, affecting 451 buildings. Of the plans 366 were passed, 42 sent back for amendment and then approved; and 27 were rejected as, in the opinion of the officers, unwise changes. The estimated cost of the alterations was $1,194,981. There have been 457 works of alterations commenced and 468 completed during the three months, leaving at present 283 works of this class in progress. Putting the totals for the two classes of work together, we have a total of $6,628,856 for the building operations of the past quarter, against a total of $9,681,123 for the corresponding quarter of 1876, a falling off of nearly one-third. There have been plans for few public buildings filed.

The bureau of iron construction, charged with the testing of ironwork for buildings, reports that 188 iron beams, 134 arch girders, and 41 iron lintels have been placed under the testing-machine, and all were approved. Twenty-two unsafe and dilapidated buildings have been removed by orders of the superintendent.

Among the architects no great or specially noteworthy works seem to be in hand. G. B. Post has a tenement which, except in plan, differs little from a thousand other human packing-houses in the metropolis. Instead of entering directly to the house at one central entrance, a pair of staircases — one well back and the other near the front — open on a court-yard six feet wide, running up the side of the lot. This leaves the front for stores, excepting the four-foot passage opening on the court. The lot is as usual 25′ x 100′. In reality it is a tenement set endwise; and the court-yard is nothing more than an open air space, into which almost every room in the house can open. There are four sets of apartments (three rooms each) on a floor.

Emlen G. Littell has a little convent building, to stand on 17th Street, near St. George's Church. It is for the Sisters of St. John, an Episcopal offshoot from the Clewer sisterhood of England. The lot is 50′ x 104′. On the front portion, extending back about 65 feet, the four-story residence will stand, in pressed brick, red joints, with wrought work of Newark stone, with the least possible amount of ornament, a mere chamfering of the window-jambs being all that is done in that direction. There will be a stone porch, with a pair of Amherst stone columns, while in the triangular transom light over the entrance, cathedral glass will be set. Running back from the building, the chapel will extend to the rear of the lot. It will accommodate about 80 worshippers beside the sisters, who will occupy the choir, extending fully half way up the chapel. The entire cost is limited to $25,000. Mr. Littell is also building a house for J. L. Lee, at Stoutsberg, on the Hudson, in native blue stone, with wrought work of Newark stone and Amherst stone porch columns. The piazza-roof will be carried as well on piers one foot square. The windows will be finished in plain cathedral glass; and within there is much that is novel, the hall, for instance, showing the beams above, open to the ceiling under the floor of the next story. The house, which measures 50′ x 60′, will cost some $25,000.

Douglass Smyth is working up a little court-house in brick, for Warren County, N.J., to cost, complete, about $30,000. George E. Harney is doing some of his careful work on a brick and stone shop front for the new Starr and Marcus jewelry firm, but the design is not yet ready for inspection or description. The Jardine Brothers are busily at work. Their recent works include an apartment house at 54th Street and Broadway, in brick and stone; on the whole, a flat of a superior class, 40 by 60 feet, and five stories high, to cost $23,000. A showy store at 47th Street and Broadway, 43′ x 60′, left in plain lofts, with front in brick and Amherst stone, and costing $16,000. For Christ Church, at Rye, N.Y., they will put up a wooden parsonage: it is in the Queen Anne style, 45 feet by 40′ in plan. For Dr. Taylor's church in this city, they will make a new exit by cutting away the sill and wall beneath of the extreme east window, and putting in a low porch in wood. The tracery of the window-head will be left, and will show above the porch roof. A two-storied planter's mansion for San Antonio, Tex., is also coming from the Jardine atelier. Its heavy stone walls, wide halls, and extended balconies, indicate its *locale* as a land of sun and heat.

The old post office, the site of which the Chamber of Commerce was so anxious to secure, that they might proceed with the erection of a grand maritime exchange building, is destined to a still longer lease of life in its present dilapidated form. William F. Bailey has leased the whole, and will convert it into stores. In changing the old building into business places, many alterations will be made in the interior; but the exterior will remain as it is, barring a coat of paint and the transformation of its old windows into the modern shop show-window.

FIRE-PROOF FLOORING.

ON pp. 299 and 308, *American Architect and Building News*, vol. i., we described the method of constructing fire-proof floors in Vienna. In further illustration of this method, we reproduce a portion of the letter to the *Builder*, in which Mr. Ladislas Vidéky, a royal Hungarian engineer attached to the Metropolitan Board of Works at Buda Pest, comments on the experiment lately made in London to test Messrs. Evarts and Swain's method of constructing fire-proof floors, an account of which we lately published.

He says of the method of construction followed in his own country: —

"We lay the flooring in this way: Round beams of about ten inches to eleven inches in diameter are sawn through in two halves, longitudinally of course, and the sides are partly hewn vertical. These timbers or beams are laid close to each other, and the spikes applied to them diagonally, the spikes having no other purpose than to unite all the joists for bearing equally the weight laid on them. The plaster is then applied in this way: Dry reeds are laid vertically to the length of the beams, and fixed to them by wire and nails in such a manner that there should be a small space left between each stem of reed. If the reeds are not long enough to reach from one end to the other of the ceiling, they must at the joining ends overlap for at least twelve inches, and be fastened by additional wires. The plaster laid on this rough surface is a mixture of common plaster and plaster of Paris, or cement, and has a final layer of stucco.

"We here place on the joists a layer of rubbish or refuse from the smelting furnaces, four inches to five inches thick, and apply the planking or parquets on the top of this layer, by first embedding into it three-inch by three-inch scantlings.

"This flooring, if made of well-seasoned timber, and with proper care, will last centuries, and resist the attack of flames for a very considerable time. In fact, we have here very rarely a case of fire where the floorings are burnt out. Usually only the roof is burnt

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off, and the ceiling of the last upper floor damaged by water. It must be noted that we make this last ceiling exactly in the same manner as the other floorings, with the only difference that it is not timbered over with planks, but either a layer of stiff clay is laid on, or it is paved with flat tiles, and that there is also left a space of at least six inches between this top and the joists of the roofing structure.

"As to building stairs with timber, we have found that it is impossible to make them fire-proof; not that the wood-work could not be protected against rapid ignition, but because the danger lies in the inevitable twisting and bending of slight woodwork in great heat, which circumstance renders every protective covering nugatory. The law therefore here is, that all communication between the apartments and the street-door must be built of incombustible material; that is to say, that all the corridors, passages, and stairs must be built of bricks, stone, or iron, and vaulted in with brick-work.

"I wish to say now a few words as to the drawbacks of this structure. In the first instance it must be stated that very wide spans cannot be floored over conveniently with this system, because this would require the strengthening of the wall to a very extravagant extent; the timbers require a certain amount of space for support on the wall. Let it be here remarked that it is unsafe to lay the timbers into the thickness of the wall. This space cannot be less than three inches, but if the span to be floored over is more than twenty feet, the support space must be increased proportionately, or the floor must be supported by pillars. Whatever contrivances may be applied for the better support of the floor-timbers, it must always be borne in mind that ultimately it is always the wall which has to carry safely the whole weight and vibration of the structure and the incidental burden, and consequently there must be a corresponding strengthening of walls.

"Great care must be taken to protect the ends of the beams against decaying. This is not an easy task to accomplish, as these ends are the very Achilles-heel of the whole structure.

"But after all it is very questionable whether all the advantages of this sort of flooring could not be secured by a judicious modification of the ordinary joist and scantling floor, which at any rate is much lighter, and therefore does not require such heavy walls as the close-timbered floor. Supposing the ordinary joist flooring to have underneath a planking with the same sort of reed and stucco cover as our flooring, and to have on the top of the upper planking a layer of rubbish, upon which the floor-planks or parquets are laid, would not that do the same service as far as fire-proof requirements are in question? I certainly should say *yes*. We have many houses built here in this way, and they have behaved during fires just as well as the close-timbered houses; but, strange to say, we have again reverted to the old method of close-timbered floors, in consequence of the greater cheapness of the latter, and partly also because the close-timbered floors are capable of supporting safely a greater weight and motion without so much vibration as the joist-floors."

Mr. W. H. Cozens Hardy writes to the *Times* from Letheringsett Hall, Norfolk, as follows: viz., "Having had a considerable fire on my premises some years ago, I was much interested in the account you published some weeks back of the fire-proof flooring designed by Messrs. Evans and Swain. I have a large malt-house, 40 ft. by 180 ft., which was built about the year 1824, over which is a chamber of the same size for storing barley and malt. The floor was made without any joists; and having resisted the ravages of a large fire on the 1st of April, 1827, it may interest your architectural readers to learn how it was constructed. The building is 40 ft. wide; and strong beams, six inches by fifteen inches, were placed on the brick walls, seven feet apart, each beam being supported by two wrought-iron columns; upon these beams three-inch deals, grooved and tongued, were fastened without any joists. The fire originated in this building, from the spontaneous ignition of high-dried malt, and in less than an hour the whole roof fell upon this floor. Some time elapsed before a fire-engine could be obtained. At length the fire was got under, but continued to burn for some twenty-four hours afterwards. To my astonishment, none of the beams were destroyed, and the floor was scarcely at all injured (only about a dozen small holes having been burnt through); and the floor exists at the present time as strong as it was fifty years ago. I may observe that this floor, though somewhat moist in its construction, was simply made for strength, and without any idea of its being less liable to be destroyed by fire than ordinary floors. I am quite certain that the safety of this floor arose entirely from the three-inch deals being grooved and tongued, thus preventing the air from getting between the joints, and feeding the flames. If a floor on this principle were made with a double thickness of three-inch deals, tongued with hoop-iron, one above the beams, and the other under, with concrete between, and with a ceiling of thick plaster, as suggested by Messrs. Evans and Swain, I have no doubt it would resist the action of fire much longer than so-called fire-proof buildings, and the cost would be very trifling. I shall be happy to show my malt-house to any one who may wish it."

ST. MARK'S. — Mr. Ruskin is at Venice, making a water-color drawing of St. Mark's.

PORTLAND CEMENT.

MR. G. F. DEACON, the Borough Surveyor of Liverpool, has published a paper on Portland cement, which he read some time back before the Liverpool Polytechnic Society. As it contains records of trustworthy experiments, it will be found to form a valuable supplement to the well-known papers on the same subject by Mr. Grant, of the Metropolitan Board of Works. Mr. Deacon was not satisfied with the kind of block which was devised by Mr. Grant as the best in form for testing the tensile strength of cement, and which has since then been commonly adopted in experiments, — that is, a block with square sides, except in the central part, to which the test was supposed to be applied, and where for about one-fifth of the length of the block the form suddenly became concave. It seemed to him that "unless the cement throughout the fractured section were perfectly homogeneous, it was highly probable that one or both of the parts immediately adjoining the shoulders where fracture commenced would have a density differing more or less from the mean density." Accordingly Mr. Deacon had made a test block, which was also of less section in the middle than at the ends, but was without corners or sharp curves in any part. More than five hundred experiments were tried with the same cement formed in both kinds of blocks; and it was found that while a block of the London pattern would indicate a breaking weight of 647 pounds for a section of 2¼ square inches, and seven days after gauging, the Liverpool block would give a strength of 753 pounds or an additional strength of nearly 16 per cent. From this it becomes plain that it is not sufficient in specifications to prescribe a certain degree of strength as requisite for Portland cement unless the form of the test block is likewise stipulated. The standard specified by the Metropolitan Board of Works is 787 pounds on the sectional area of 2¼ inches, or 350 pounds to the square inch; but with his new block of the same area Mr. Deacon specifies the tensile strength at not less than 800 pounds per square inch, and the average strength of the cement supplied during a year amounted to 871 pounds. For ascertaining the transverse strength of Portland cement, Mr. Deacon suggests the following specifications: "Samples of pure cement shall be gauged with water, and pressed into a mould 10 inches by 1½ inch by 1½ inch. The block of cement thus formed shall be placed in water, and, after seven days, tested by placing it on supports 9½ inches apart, and gradually applying a load of 150 pounds on its centre. If more than one out of three blocks are broken within one minute of the application of the load, the engineer or architect shall be empowered to reject the whole of the cement from which the samples were taken."

The following is the specification for Portland cement which is adopted in Mr. Deacon's office: The cement must be of uniform quality, and capable of bearing the following tests to the satisfaction of the engineer: 1. Samples of the cement, being sifted through a No. 50 gauge wire sieve, must not leave a residue of more than 10 per cent. 2. Samples of pure cement will be gauged with water and placed in the brass moulds used by the Corporation. Within twenty-four hours the casts thus made will be immersed in still water, in which they will remain until the expiration of seven days from the date of moulding, when they will be taken out of water and tested to ascertain their tensile strength, which must not be less than 800 pounds on the sectional area of 2¼ square inches. 3. In ordering the cement it will be distinguished as quick setting or slow setting. The slow setting cement, when gauged neat in the moulds, must not become firm in less than three hours. The quick setting cement must assume a firm condition within half an hour. The test for firmness will be that of resistance to the finger-nail, the test at present adopted in the department. The above tests will be applied after each delivery; and should the result be unsatisfactory to the engineer, he may — having given notice to that effect to the contractor within eleven days of delivery — require the whole of such cement to be removed at the contractor's expense. With each delivery the contractor shall send a memorandum of the quantity delivered, and the name of the manufacturer. — *The Architect.*

NOTES AND CLIPPINGS.

BAD WALL, NOT BAD GROUND. — Chief Inspector Robert McGinniss of the Building Department has prepared a special report covering the accident to the buildings in East Twenty-Third Street, New York, where the brick party-wall between two tenements suddenly dropped some six feet, completely wrecking the adjoining buildings. The report sets aside the theory that the mishap was due to a sinking of the underlying soil, and considers that it was due entirely to defective workmanship in the stone foundation wall. The soil was found to be a good hard-pan, and was compact enough to carry any building in the city.

FAILURE OF A RESERVOIR. — About 3.30 o'clock Sunday afternoon, July 8, the new reservoir at Athol, Mass., on a hill 250 feet above the main village, into which a large volume of water had just been emptied, gave way beneath the pressure. The flood carried away several mill-dams, and caused more or less damage to other mill property on the banks. The reservoir was built by contract, and was accepted by the town on the day before.

NEW STATE PRISON FOR NEW HAMPSHIRE. — The bill providing for a new state prison has passed the House by a vote of 214 to 105.

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THE THOMAS CONCERT GARDEN. — It is said that the projectors of the Thomas Music Hall are disappointed at the result of the invitation for subscriptions. Only $180,000 has been pledged, while $250,000 is necessary to begin the work. A renewed attempt to enlist popular interest will soon be made.

INSECURE BUILDINGS. — Building Inspector Shaw ordered taken down last week, as being unsafe because of the settling of foundations and cracking of walls, the block of six brick houses on Ruggles Street, corner of Westminster, Boston. The buildings were at one time moved back, had new foundations built under them, and were again brought forward to the street.

INCENDIARISM. — An incendiary attempt was made to burn Trinity Church, Boston, on July 13.

A CLAIM ALLOWED. — Mr. M. Clements, proprietor of the "Architectural Iron Works" of Cincinnati, O., has had his case against the State of North Carolina decided in his favor. The case briefly stated is this: In 1871 plaintiff entered into a contract with defendant to furnish all the iron-work necessary for the State prison. Iron at that time was much higher than it is now, or was when they were ready for the iron-work. Plaintiff had already got out part of the work when defendant through its legislature annulled the contract, and had the work done in accordance with the lower price of iron; whereupon plaintiff brings action to recover the amount of his profits on the work, together with the amount of work done, and after the usual "law's delays" gets a final judgment (from which there is no appeal) of $20,000. This amount is not all that was asked for, but nearly so.

THE LIFE-SAVING SERVICE. — The statistics of wrecks which have occurred within the range of the Life-saving Service during the last fiscal year have just been published by the Treasury Department, and show that the number of vessels driven ashore during the year was 120, and that they had on board 1,253 persons. Of these 1,214 were saved, and 39 lost. The estimated value of the vessels wrecked was $1,746,464, and of their cargoes $1,348,876, making a total valuation of $3,095,331. The whole amount of property saved, so far as reported, was $1,554,505, and of that lost $1,053,826, leaving $487,000 not yet ascertained whether saved or lost. At fifty of the disasters, the Life-saving Service apparatus was successfully used, and 838 persons were rescued by it.

MALARIA AT WASHINGTON. — An epidemic of malaria is said to have broken out in Washington, of so violent a type that people are taken sick with nausea and vomiting in the streets. It is attributed to the removal of the rotten wooden pavement, and the general upturning of the soil of the streets while re-paving the city.

SAND FOUNDATIONS. — It is said that the walls and iron columns of the Cooper Institute, New York, rest upon nothing but sand for a foundation, although they have to support a fire-proof structure one hundred feet high above the sidewalk. Although the building is some twenty years old, it has shown no signs of settling.

THE LARGEST RAILWAY STATION IN THE WORLD. — The new railway station at York, Eng., said to be the largest in the world, was opened on the 25th ult. It is not a terminal station, so trains will run straight through it. The length of the platform is to be 1,500 feet, while the covered portion of the station is in length 800 feet, and in breadth 234 feet. The height is about 50 feet. The superficial area of the platform at York is 171,051 feet, and that at St. Pancras, London, 165,360 feet. The roof consists of four semicircular spans, the largest of which is that in the north centre, which is 81 feet wide, and covers four lines of rails. That springing from the north wall is 55 feet wide, and covers a platform and three sets of rails.

THE PROPOSED MONUMENTAL PULPIT FOR ST. PAUL'S. — It appears that the proposal made some time ago on the part of some workmen in Paris to place a pulpit in St. Paul's, as a proof of international sympathy, is not likely to be carried out, after all. The Lord Mayor has lately received communications from Paris, which show that the project was due to the friendly feeling and enthusiasm of M. Mignot, who originally wrote to the Lord Mayor on behalf of the Association of Working Carpenters and Joiners in Paris, but who has since been disavowed by his colleagues. M. Mignot has made a second proposal to organize a general subscription in Paris for his original scheme. To this, however, the Dean and Chapter of St. Paul's felt an objection, which will be generally shared by their countrymen.

CLEOPATRA'S NEEDLE. — In preparing to move the obelisk at Alexandria, two inscriptions have been found upon it, — one in Latin, the other in Greek. They fix as the year of its erection at Alexandria, by Barbarus, prefect of Egypt, the eighth year of Augustus Cæsar's reign. Fontius, the engineer, did it.

ACCIDENT TO THE TAY BRIDGE. — Towards the end of June another large truss weighing twenty-four tons fell, causing death. This accident raised to twenty the number of deaths which have been caused by accidents during the construction of this bridge. It is expected that the first train will cross the river on the 15th of September.

THE SPECIFIC GRAVITY OF WOODS. — The woods which are heavier than water are Dutch box, Indian cedar, ebony, lignum-vitæ, mahogany, heart of oak, pomegranate, vine. Lignum-vitæ is one-third heavier, pomegranate rather more. On the other hand, cork having a specific gravity of .24, and poplar, .383, are the lightest woody products.

GERMAN BRICKS. — German bricks measure 6.5 cm. (2.55″) x 1.2 cm. (4.71″) x 25 cm. (9.82″).

CREMATION. — The municipality of Paris have resolved to petition for a law permitting cremation.

FLOODING THE SAHARA. — The French physicists are not quite so certain about the advantage of flooding the Desert of Sahara as they used to be. M. Naudin does not hesitate to say that the proposed sea would probably be a huge pestilential focus. In the rainy season the waters would extend a great distance over the flat shores; and in the dry season the waters would recede, leaving exposed a damp area, favorable for the production, under a tropical sun, of organisms which would putrefy and vitiate the atmosphere all around.

MONUMENT TO THE DUKE OF GENOA. — A monument to the Duke of Genoa — the brother of Victor Emanuel, and father of the Princess Margaret, who married her cousin, Prince Humbert — was unveiled recently at Turin. It is an equestrian statue, representing the Duke at the battle of Novara, just as his third horse is killed under him. This prince, who bore an active part in the battles of that period, died young in 1855, but left a glorious record behind him.

ULM CATHEDRAL. — The corner-stone of Ulm Cathedral, which, to use a local expression, was to serve as a jacket for the cathedral at Strasbourg, was laid in 1377, when, because of the increasing trouble between the citizens of the Free Cities and the feudal nobles, the citizens felt the need of having the principal church within their own walls. Until the Restoration put an end to some of the sources of income as well as to the interest of the inhabitants in the work, the building had made good progress. For four centuries and a half the cathedral remained unfinished and gradually falling into bad repair, until, stimulated by the exertions that were making to repair Cologne Cathedral (the only cathedral in Germany which is larger than that of Ulm), in 1840 work was again begun upon it. During the month of June, the fifth centennial anniversary of its foundation was celebrated. At that time, the restorers had completed all the flying buttresses, and had so assured the safety of the nave. The southern bell-tower is nearly finished, and the northern tower will be finished in a few years. If the revenues — derived in great part as at Cologne from a regularly-established yearly lottery — continue good during the next ten years, work on the main tower will be undertaken, and the whole building finished. Work upon this tower was stopped in 1492, because two of the pillars under it gave way. Had it been finished according to the original design, it would have been 491 feet high.

PAPER IN CENTRAL ASIA. — Nearly all the paper which is used in Central Asia is manufactured at Khokand and at Tcharku, a little village in the khanate of Khokand. The process of making it is rude and slow, yet interesting as a hint of the achievements of the native Asiatics in the industrial arts. We extract an account from the works of Schuyler on Turkistan: "The rags are alternately pounded and macerated until they are reduced to a thick pulp, which is then collected into a round ball. Portions of this are then placed in a tub of water and well mixed together. The paper-maker takes an oblong sieve, made of thin grass stretched over a wooden frame, and puts into it a quantity of the pulp, shaking and inclining it until it is equally distributed over the surface. After allowing it to stand for a few moments, he turns it out on a board. In this way one man can make about 300 leaves per day, which are placed one on the other, with layers of felt between, and submitted to a heavy pressure to squeeze out the moisture. In the morning they are taken out and hung for drying on a wall exposed to the south. The sizing and polishing are done in the bazaar, by a different set of workmen. The size usually employed is a kind of dextrine found in the roots of the shirash, a plant of the lily family; and the polishing is made by a smooth, heavy stone. By this process the value of the paper is nearly doubled (from ten to thirteen or twenty cents a sheet). Imperfect paper is, however, never thrown away; for at the time of sizing, holes or fissures are patched up with their strips, and the surface is made so even that the defects can only be discovered by holding the sheets up to the light. The paper, which is usually gray, although sometimes colored pink and blue, is very tough and firm, and excellent for the gummy ink with which the natives write. For the purposes of the Europeans it is of little use, and the Russians have to import all the paper they require."

ELECTRIC PLANT. — The *Gazette Horticole de Nicaragua* publishes some information respecting a plant of the family of *phytolaccas*, which grows in that country, and which possesses electro-magnetic properties. When a branch is cut off, the hand holding it experiences an electric sensation similar to that received from a Rumkorff battery; and the electrical influence of the plant has been observed several paces from the plant by the deviation of the needle of a small compass. When the compass was placed by the experimenter close to the plants, the needle turned completely round. The soil is said by the *Moniteur Industriel* to contain no trace of iron or other magnetic metals, so that the property is inherent in the plant itself. The intensity of the phenomenon varies with the hour of the day. At night it is almost *nil*, and most intense during the two midday hours or in a wind; during rain it was weak. No birds or insects have been seen to rest upon the *phytolacca electrica*.

A CHANCE FOR THE HEMLOCK TREES. — Hemlock lumber is gradually growing scarcer in New York, especially in Warren County. A barrel of tannin extract is produced from a cord of the bark, the value of which is $20.00. A cord of alder, it is now found, will yield the same amount; while a ton of sweet fern gives $22.00 worth of the best tannin, and $7.50 of an inferior kind. In Maine the industry of extracting tannin from ferns has already attained considerable dimensions.

OLD AND NEW. — Sir Gilbert Scott, during an examination before a committee of the House of Commons, said that it was his opinion that people did not complain of old buildings, but only of new ones.

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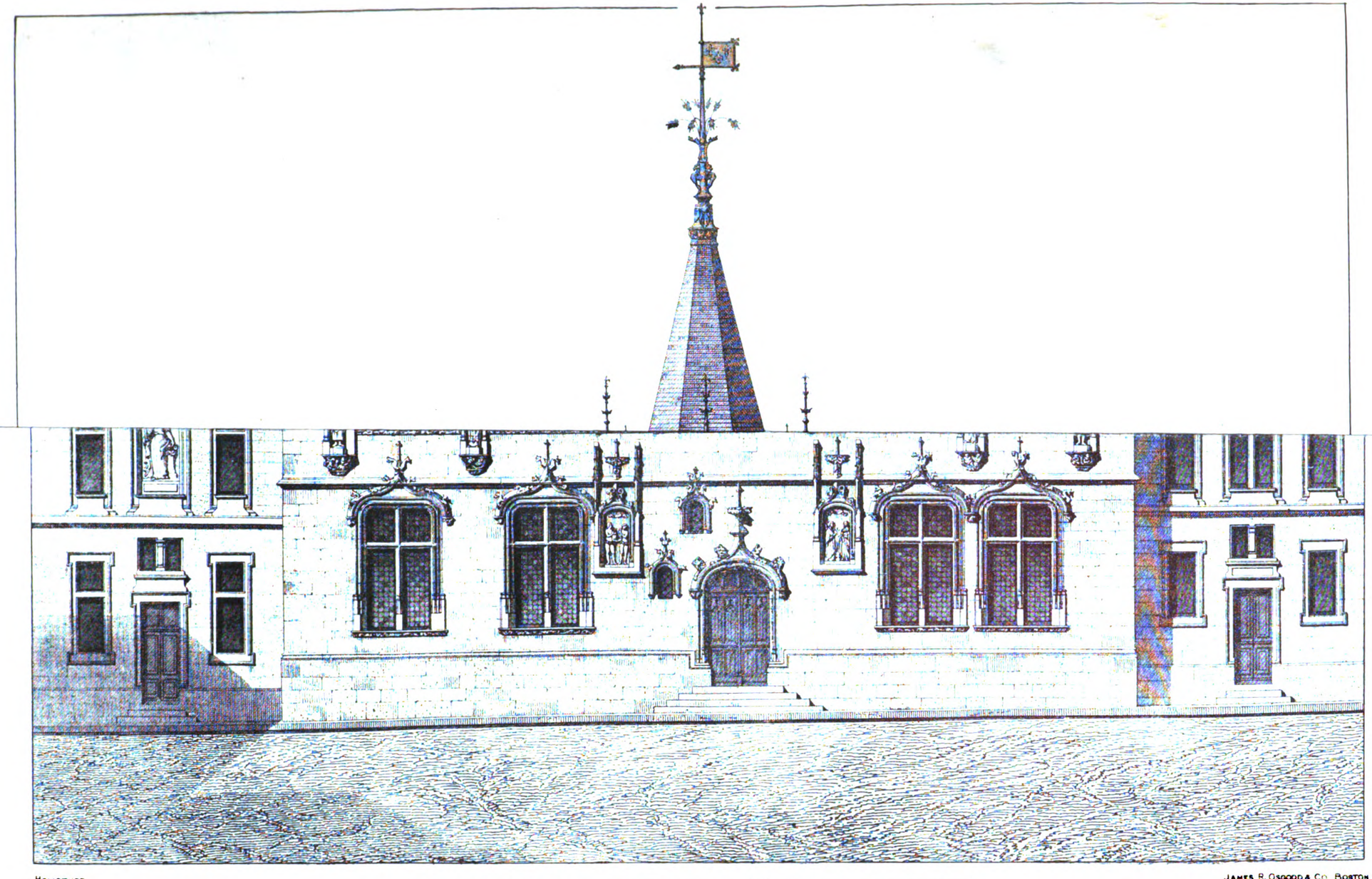

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TOWN HALL AT COMPIÈGNE, FRANCE.

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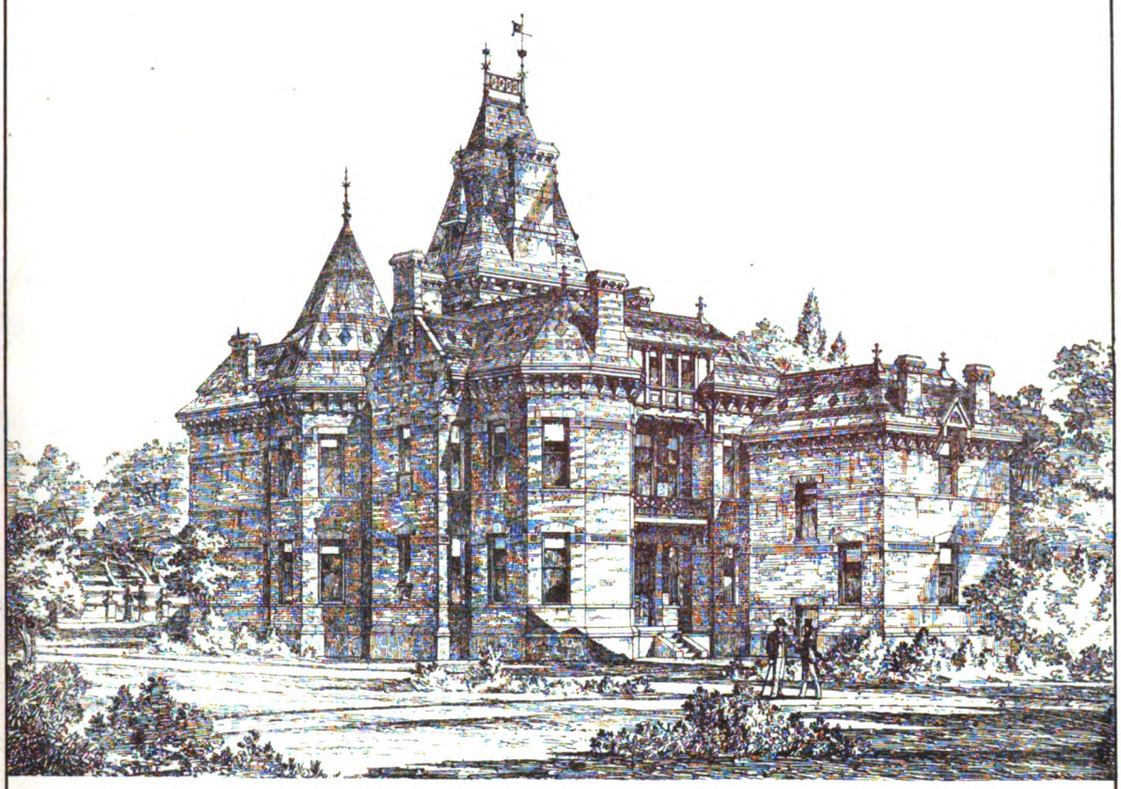

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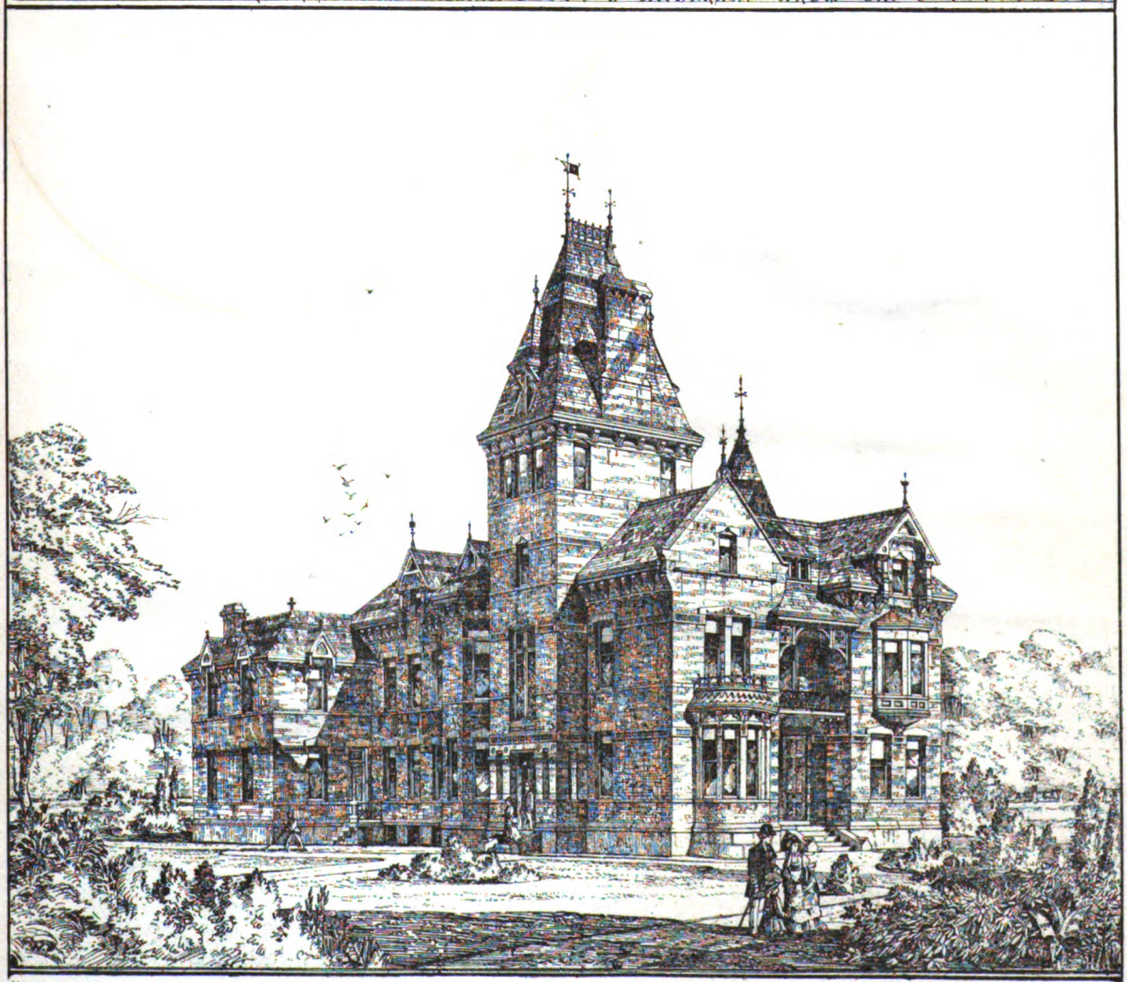

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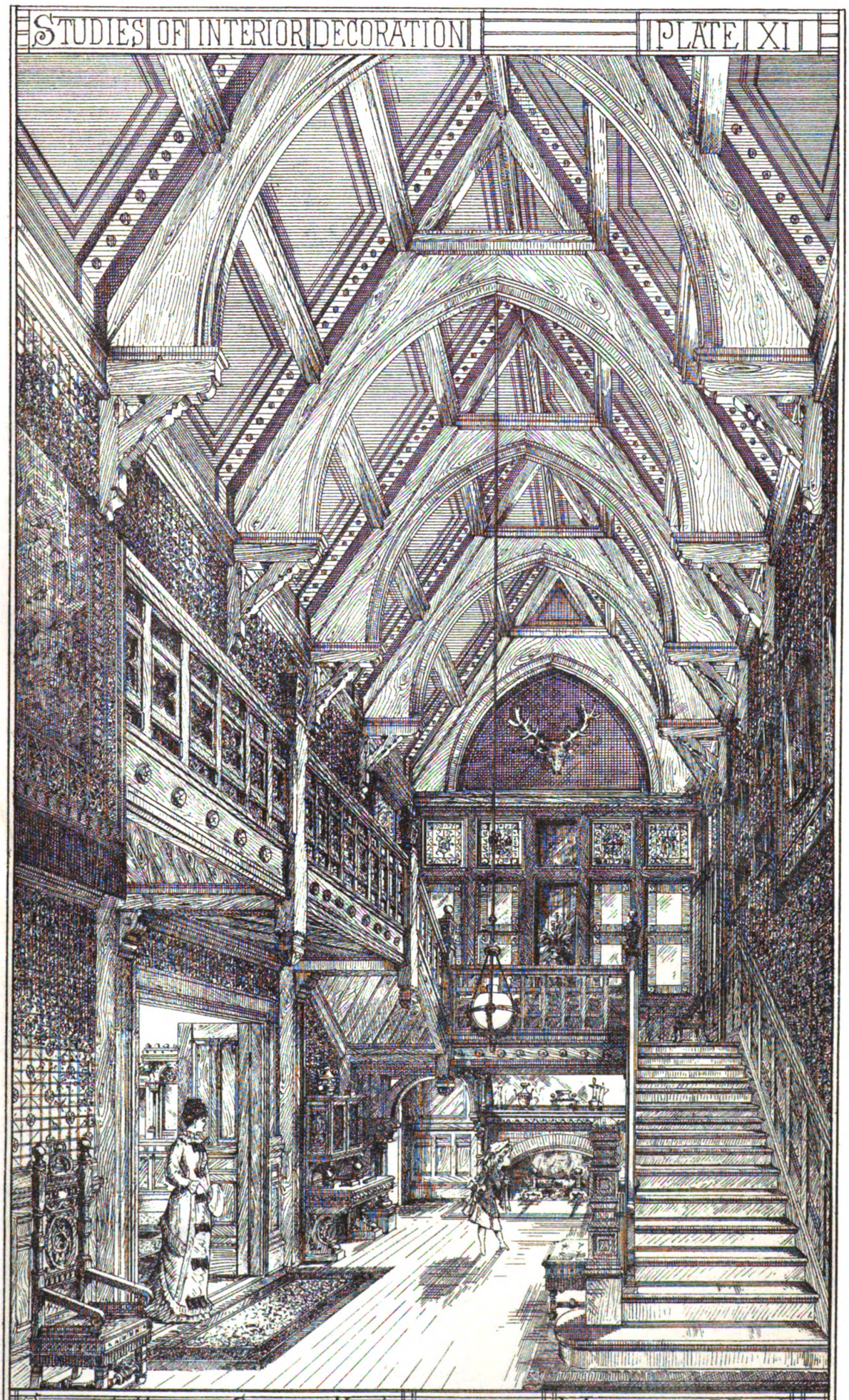
STUDIES OF INTERIOR DECORATION PLATE XI



STAIRCASE HALL FOR COUNTRY HOUSE WELLESLEY MASS

F.M. Howe del. WARE AND VAN BRUNT, ARCHTS.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, JULY 28, 1877.

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WHEN the interests of charity, political economy, and finance are equally subserved by the same process, one of the ideal conditions of society may be said to have been reached, and one of the most difficult problems in social science solved. Hitherto these interests have been antagonistic; but by the strange complications of modern society, it seems to be reserved for the architect to accomplish a happy reconciliation; and this not in the exercise of his function as an artist, *decori urbium*, but in the exercise of the less glorious but certainly no less important duty devolving upon him as a practical man of science, adapting small means to large ends, *usui civium*. The charity we refer to is, in fact, that kind which begins at home,—in the improvement of the dwellings of the poor, and thereby in the creation of that sense of self-respect among the occupants which is the surest safeguard against crime. It is, moreover, that most effective form of charity which blesses him that gives and him that takes; which pays capital, not in good conscience alone, but in assured and regular dividends, and pays labor or poverty in conferring a sense of comfortable and wholesome independence. Doubtless our fellow-citizens of Philadelphia have carried this practical form of charity to more satisfactory results than have been reached elsewhere,—certainly in this country. Their efforts have been directed, as is well known, towards the building of independent houses for families at low cost, and subject to rents sufficient to pay a proper interest on the investments, with a balance appropriated to the gradual extinguishment of the debt in each case. When this object is attained, of course the house becomes the property of the occupant. He is encouraged by this means to habits of thrift, economy, and self-respect. His savings, instead of being deposited in savings banks, which have hitherto been of bad reputation in that neighborhood, are invested in real estate; and he thus acquires a new interest in the public welfare, and becomes a more responsible citizen. In New York we believe nothing has been accomplished in this direction as yet. Mr. Stewart's costly home for the working-girls in that city, now approaching completion, is a magnificent but ill-directed benevolence, which, if bestowed in a manner to create independent homes instead of a palace for the poor, would have apparently been far more consistent with the requirements of sound political economy, as well as of the wisest charity, and much more in accordance with those business principles to which is attributed the creation of his colossal fortune. Mr. Alfred H. White, an intelligent citizen of Brooklyn, has erected in that city certain "improved dwellings" of this class, which, in respect to convenience, economy, and sanitary arrangements, are said to be excellent; and, what is more to the purpose, they are paying in their rentals twelve per cent on the cost of land and buildings.

MR. CHARLES BARRY, president of the Royal Institute of British Architects, has just erected three blocks of buildings for artisans and laborers, under the auspices of the Metropolitan Association for Improving the Condition of the Industrial Classes of London. This is a building association, which in its thirty-third report, lately issued, has declared its profits for the year to be $35,000, authorizing a dividend of five per cent to the stockholders, and leaving a handsome fund for the continuous prosecution of its benevolent enterprises. The buildings referred to were opened by the Prime Minister and several members of his cabinet, and the proceedings on this occasion were printed by all the leading journals of London. In another column we insert extracts from the English *Architect*, giving a description of these buildings. The present government of England claim to have established, as a part of their political policy, the improvement of dwellings of this class. So far as we can learn, however, this policy—although the declaration of any public policy whatever in this direction is in itself a very significant fact—has taken shape merely in an act passed in 1875, allowing (not requiring) the clearing of such areas in large towns as are occupied by overcrowded houses, so that buildings constructed with due regard to the needs of civilization, as now distinctly defined by experience and sanitary science, may be erected thereon. So far but few towns have availed themselves of the option; and in the metropolis the act seems hitherto to have been ineffective, although the association to which we have referred has just made application to the Board of Works for certain sites under the act. It appears from the record, that the death-rate per 1,000 has, in the improved districts, fallen from 22 to 15, and the moral health has of course improved in even greater proportion. It is important to note, however, that all the houses built by all the societies in London for the last twenty years, including, of course, those erected under the Peabody fund, accommodate only 40,000. This does not keep pace even with the natural increase of the population in that city, which is 40,000 annually. The *Saturday Review* asserts that it would require an expenditure of $250,000,000 to make good the overcrowded districts in the metropolis.

THE official reports of the foreign representatives concerning the international exhibition of the arts and industries at Philadelphia are now beginning to appear; and those which have fallen under our observation present a very flattering view of the progress of the United States in all branches of manufactures. In the practical arts, from watch-making to lock-making, from cotton fabrics to machinery of all kinds, we find that we are already considered dangerous rivals of the older countries; and in not a few respects that we are in advance of the rest of the world. But so far as we are concerned, it is evident that the main advantages to be reaped from the Exhibition are not contained in the acknowledgment of our excellences in a few things, but in the knowledge of our failures and shortcomings in many things. We need to be aroused to a keen sense of our deficiencies; and we shall make the best use of the occasion, if, instead of congratulating ourselves on our successes, we take pains to discover how and why we are inferior to other civilized nations. The first exhibition in Hyde Park justified itself to the English people by the disclosure it made of their very secondary position in all those works of the hand and brain into which the element of art or taste entered as an essential feature. What they have since accomplished to remedy these defects, under the spur of the painful contrasts then first presented to them, constitutes perhaps the most remarkable chapter in the history of art. In ornamental fabrics, wall-papers, pottery, decorative metal-work, wood and stone carving, furniture, and stained glass, they are already exceeded by no other nation; in some of these respects they are without a rival. If we could in the same way make a good use of our evident deficiencies in the education of art, as shown in the instructive contrasts at Philadelphia, we too might accomplish a new renaissance. It may perhaps be accepted as a hopeful local sign, that so many examples of foreign artistic workmanship remain in the Pennsylvania Museum of Industrial Art. The influence of such collections illustrating the application of art to manufactures, if they could be made in every great city of the Union, would be incalculable. Our mechanics sadly need models of good industrial art. The capacity and the desire to improve are useless without the instruction and incentive of examples. In the absence

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of such incentives, — the fruits, moreover, of the training of hand and eye in public drawing-schools not having yet had time to ripen, — every architect has found by experience that the attempt to introduce artistic feeling in mechanical work is disheartening to the last degree. The highest aim of the American artisan is perfection of mechanical finish, accuracy and closeness of joints, neatness of workmanship, smoothness of surface: these are qualities which he can understand; and no mechanic in the world can surpass him in these respects. But if he is told that in certain work neatness and smoothness are to be subordinated to vigor and expression; that tool-marks are not to be concealed; that the characteristics of one material are not to be imitated in another; that the architect would prefer to have his design of ornament followed with feeling and sympathy rather than imitated with accuracy and mechanical precision, — he cannot understand; and his work continues to be laboriously filed and sandpapered and puttied until the expression of hand-work has entirely disappeared, and the result is as if cast in a mould.

IT was the hope of the architects of Boston to be able to exhibit in the Museum a creditable collection of artistic iron-work obtained in response to their invitation to the smiths. But the single specimen submitted by them, although characteristic and interesting in its way, was not of a nature to benefit art by its exposition. It was executed by a patient and careful workman, skilled in mechanical processes; but it possessed few qualities to distinguish it from cast iron or from a wooden model, and none which properly set forth and excused the labor which had evidently been bestowed upon it. The only quality wanting to the workman was artistic knowledge; and this, with less labor and even less mechanical skill, could have produced a work of art. We are convinced that if the Museum had contained a dozen pertinent examples of artistic work in iron, large or small, the response of the intelligent smiths would have been far larger, and there would have been opened to them a new field, not of profit only, but of that kind of enjoyment which the artist experiences in creating expression out of inanimate things. Photographs, drawings, and descriptions, such as were furnished in our number of March 24 with the especial object of instruction in view, are nearly useless to the mechanic; he needs to see good work, with the tool-marks and hand-marks upon it, and the best results cannot fail to follow. The loan exhibition at the Philadelphia Museum contains grills, hinges, altar-rails, standards, fire-dogs, and other objects in wrought-iron, by English workmen, together with a few examples of earlier art, such as a pair of Florentine andirons of the sixteenth century. Our Philadelphia brethren have thus an excellent opportunity to secure good work from their smiths. If properly encouraged and directed, every intelligent workman is prompt to learn from example; and if, with the advantages of a museum properly equipped with objects of industrial art, he does not outgrow the blight thrown upon his craft-spirit by the prevalence of poor castings and sheet-iron work, the blame may in large measure rest upon the architects who are in position to require a fundamental improvement. Let the profession, then, take the first step forward, and urge upon the trustees and curators of museums the great and obvious importance of making collections for the improvement of industrial art. In every intelligent community the small amount of money needed to obtain such a collection is readily available.

THE Boston Chapter of the American Institute of Architects, in its sessions of 1876 and 1877, with a view to the encouragement of the higher qualities of industrial arts, established a series of prizes, and invited modellers and workers in iron respectively to compete. To the former they proposed an ornamented frieze of certain dimensions, and to the latter an iron strap-hinge, wrought by the forge and hand into decorative form. To these invitations, disseminated by advertisements and by personal appeals, the modellers responded with encouraging alacrity and enthusiasm. In this department there were about twenty competitors; and of these at least half presented models of such excellence in design and workmanship, that the judges were seriously embarrassed in making choice. There were two figure-subjects, and several arabesques; the rest were compositions of foliage and animals. The prize was awarded to Mr. John Evans of Boston, for a foliated frieze in high relief, with birds and animals in the Gothic manner; but there were several other friezes of excellence so nearly equal to his, and in some respects indeed superior, that it was evident that among the two or three best examples the only distinction to be made depended not so much upon composition and treatment (the essential qualities) as upon choice of subject. The best of these competitors, however, had learned their art in the English schools of design, and practised under English architects before they came to this country. It was not a competition of Americans brought up under native influences, although it was not without a purely native element, which was more than respectable even in this dangerous comparison. In so far the Chapter considered that its little enterprise was justified by the event; and the competitors probably have no reason to regret labors which have served to make their qualities better known among those best able to appreciate and employ them. By the kind permission of the Trustees of the Boston Museum of Fine Arts, the best of the works submitted in this competition remain on public exhibition in one of their galleries, and there have, for several months, attracted a great deal of well-merited attention.

THE arrangements for the decoration of the new Manchester Town Hall in England by mural paintings of a high order are a most satisfactory and encouraging sign of the gradual restoration to painting of its original, natural, and noblest function of adorning architectural works. We are glad to learn that the scheme of Mr. Waterhouse, the architect, and his selection of artists have been approved by the city council. The history of Manchester is to be illustrated on the panels of the great hall by Messrs. F. Madox Brown and F. J. Shields; the panels of the banqueting-room are to be intrusted to Mr. W. J. Yeams; those of the reception-room to Mr. P. Calderon; the walls of the mayor's room are to be decorated with symbols of wealth, industry, and social order, by Mr. W. B. Richmond; and those of the ante-room by Mr. Walter Crane, his subjects setting forth the relations of Manchester with India. The amount of money available for this purpose is about $45,000. For this comparatively small sum this great public monument is to receive its most appropriate and dignified decoration. The interests of art are materially advanced by this most auspicious event. When shall we too see the gaping wall-spaces of our public halls so nobly treated? When we consider that the cost of the usual jobbery of vulgar marbles and redundant carvings in the furniture and equipments of our city halls, state houses, and other public places, would be sufficient to cover their walls with the most noble and effective of all decorations, we certainly have need to regret our wasted opportunities, and to pray for those better times when art, which enlightens and refines, shall have its due place in our public works before the luxury which ministers simply to vanity and ostentation.

MR. JOHN DIXON, to whose enterprise is due the execution of the interesting work of removing to London the prostrate obelisk known as "Cleopatra's Needle," having observed that an antique model obelisk in the Museum of Madrid rested upon four bronze feet, has caused the foundations of the standing obelisk in the immediate neighborhood of the prostrate one to be uncovered. This excavation has revealed the curious fact that these twin monoliths each rested formerly upon four "bronze crabs," which thus lifted them eight inches clear above the pedestal. One of these "crabs" still remained in position, the open space at some period of spoliation and defacement having been filled in with coarse masonry. The bronze, though mutilated, is stamped with legible inscriptions in Greek and Latin as follows: "In the eighth year of Cæsar Augustus, Barbarus, prefect of Egypt, caused this obelisk to be erected by the architect Pontius." This date corresponds with the year 22 B.C., when the two ancient obelisks were triumphantly re-erected in front of the temple of Cæsar Augustus at Alexandria. The shaft which is about to be moved to England bears upon the corners of its base certain notches, hitherto unexplained, but which correspond with the position of the bronzes.

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ARCHITECTS' COMPENSATION.

IN considering last week the theory of an architect's compensation, we mentioned incidentally a few of the circumstances which tell in favor of the existing system. We did not intend to enter on a full discussion of the relative advantages of the different methods of payment that might have been adopted, nor do we now. Since, however, there is a tendency to expect from business analogy that an architect's payment should be adjusted with precision to his work, and since one often hears a different system advocated, — commonly one of payment by time, — it is perhaps worth while to consider the merits of the case a little more in detail.

The simplicity, openness, and easy application of the accepted method are apparent enough. The objections which may be raised to it are, that it is a loose method; that the client does not know how much work he is getting for his money; that there is no pretence even of a careful adjustment of the payment to the labor performed; it is argued too, that an architect should not have the opportunity to increase his own compensation by increasing his client's expenditure, as he may if he is paid by a percentage. To the first of these objections, — the unfairness of an unadjusted compensation, — it may be answered, that there is no unfairness where there is no pretence of adjustment. The unfairness would be in a system that assumed to adjust itself, and then did not do so; and here, in our opinion, is just where a fatal weakness would be found in a method of payment by time. The client really need not concern himself whether he gets as much labor out of his architect as another, so long as he gets his money's worth in the value of the service. It being once understood that the payment is for the service and not for the labor, as it is in the case of a physician's or a lawyer's fee, and that the architect and not the client is to take the risk of the amount of labor, the question of unfairness on this account is at once eliminated from any particular case. There only remains the general question for the community, whether on the whole the fee paid for architectural service is fixed at the right point as a fit equivalent in the long run; but this is a question of amount and not of method.

As for the objection that the system of percentages makes it the architect's pecuniary interest to increase the cost of his client's building, the objection certainly applies so far as it has force. But dangers occur with all agents to whom affairs of importance are intrusted to be conducted at their discretion. The client, since he cannot intelligently direct the architect's work, cannot get the full benefit of it without allowing him discretion in carrying it on. The safety of such a relation of course depends upon the standard of character and fidelity that obtains among architects. Their temptation to enlarge their fees by increasing their client's expenditures is analogous to that which a lawyer has to lead his client into litigation or the physician to prolong his patient's disorder; and probably the proportion of such bad practice does not much differ in the three professions. There will, of course, be dishonorable practitioners in every community; but the client who is himself scrupulous will generally find it practicable to avoid them. With an architect he is not less protected than with most professional agents, since he can fix the limit of his expenditure if he will; and the architect not only finds it difficult to involve him in expenses which he absolutely refuses to undertake, but exposes himself to be punished if he does so. Moreover, though the consequences might not be so disastrous to the client, the opportunities to the architect to increase his fees would be quite as great under any system of graduated fees. It is, at least, no harder to increase or misrepresent the time spent on work, than to enhance the cost of it; and the danger would not only be more insidious to the architect, but more inscrutable to the client. It is impossible, in fact, by any law or system to guard against the abuse of confidence by confidential agents. The thing which a prudent man or a prudent community will naturally do is to refrain from delegating authority except for an adequate advantage to be gained by it, and to establish as complete accountability for it as possible.

When we come to consider the convenience and precision of a payment by time for architectural service, it is not easy to see how it commends itself. It would be exceedingly laborious for an architect to keep a close account of all the time he gives to each of a number of undertakings which he may have going on together; and to justify it to his client would be impossible. No allowance could be made for many of the things which add to an architect's labor, no computation of a great deal of the time it demands from him. But if such a computation cannot be accurate, it loses all its value. There is no argument but its precision in favor of undertaking a computation so laborious. A minute and particular charge is no more reasonable than a general one if it is not more accurate; nor more satisfactory to the client, if it cannot be better substantiated.

A still more logically convincing argument, though not more practical, is, that the time is not the only nor even the chief element of value in the architect's labor. After allowance was made with as much precision as possible for the time he had directly given to his work, the value of his conception would remain unrated. This conception may come in a moment, or it may be wrought out by slow study. The most brilliant and precious idea that ever architect conceived, if it flashed upon him at once, as a valuable conception often will, would under a system of payment by time be worth nothing to him, while an inferior one at which he had arrived after long effort would bring a recompense. What astronomers call the personal equation here comes in to modify the result, and defies computation. Quickness of conception, whether it be the result of natural endowment or of trained skill, should enure to the benefit of its possessor, instead of stripping him of his compensation because it saves his labor. Quickness and readiness, ability to judge of a problem and furnish promptly a satisfactory solution of it, are the result and index of training and experience, — conditions which, in all walks of life, are held to enhance, not diminish, the value of a man's work. These cannot be allowed for in payment by time, unless in payment graduated in every case to the individual, such as cannot be provided by a general system.

Here we come to what is after all the real essence of the question. Time-payment is unsuitable, not only because it is inconvenient and lacks the precision that it ought to have, but because time is here no measure of value at all. Mechanical or routine labor, in which one good workman's work does not greatly differ from another, may with propriety as well as with convenience be paid for in wages. A man may be expected to turn out a known amount of it in a fixed time, so that the master who is to pay for it in days' wages can estimate beforehand what it will cost him. What is more essential, the standard for it is perfectly understood, so that it is known beforehand what it will be or ought to be. But for artistic or professional work there is no fixed standard, and its character cannot be foretold. The personal element enters into it too largely for this. Its value lies in the professional skill and judgment of the practitioner. When an important and difficult question is carried to a lawyer for advice, if his special study has qualified him to give a decisive answer to it at once, it would not do to fix the payment by the time he occupies in answering it. If his answer is prompt, it is, in fact, the more valuable, since it saves his client's time; and his charge is grounded on the importance of the question. So it is with the architect. Although he does a certain amount of mechanical or purely business work, for which he might, if it stood apart, be properly paid by time, the essential and characteristic part of his service is a compound of professional judgment, of the inventive faculty, natural and acquired, and of artistic power. The workings of these are not to be computed by time, and can only be valued by the importance of the result. If an inventor offers for sale some new contrivance, the purchaser of the patent-right inquires what it is worth now that it is perfected, not how much time did he spend upon it; — but every work of an architect is an invention. It would be absurd for the purchaser of a painter's sketch to concern himself with the time it took the painter to make it: he only asks what is its value as a work of art. But the architect's design is, in theory at least, a work of art: the skill and the inspiration of it give it its value, as they do to the painter's sketch. If it were possible to assign a value depending on recognized ability to an architect's work, as the natural selection of the world does to a painter's, it might be in keeping with the nature of it; but the fact that the business element is so inti-

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mately associated with the characteristic part of his labor, requires a business-like system of payment; and so we come back again to the importance of his service to the client, as the only applicable measure of his compensation. Though even here an exact measure is a thing not to be attained, still, in a general way, the importance to the client of having the work satisfactorily done may be said to be in the ratio of the cost of it. This gives the necessary assurance to the client that he gets a return for his money; to the architect that his most important commissions will pay him most: while it saves both of them from a great amount of laborious and unrewarding computation of incomputable things, as well as from endless occasions for dispute.

SANITARY ENGINEERING.[1]

III.

MR. DENTON, in referring to the sites of dwellings, quotes from Bacon: "He who builds a fair house upon an ill seat committeth himself to prison," and says, "the engineer has power by appropriate drainage to render a subsoil which is naturally wet and polluted, both dry and wholesome." This is confirmed by the following table from Mr. Simons's report of 1868, showing that in the following towns the death-rate from consumption was reduced by the drainage of the ground, in the percentage indicated by the table:—

Salisbury	49	Cheltenham	26
Ely	47	Bristol	22
Rugby	43	Dover	20
Banbury	41	Warwick	19
Worthing	36	Croydon	17
Leicester	32	Cardiff	17
Macclesfield	31	Merthyr	11
Newport (Monmouth)	32		

The statement made by Mr. Rawlinson that sewers and house drains, when practicable, "*should be made to act* as land drains," Mr. Denton strongly condemns; and, in our opinion, he is quite right in doing so.

Concerning Mr. Denton's details of house-drainage, and of the disposal of the liquid outflow of houses, we cannot speak in such terms of commendation as are elicited by the general character of his book. Much space is taken up with illustrations of water-closets, traps, and other details of plumbing, not apparently with the chief purpose of illustrating principles, but with a view to make a bigger book and to add to the show of pictures. It looks as though the cuts used by manufacturers in their advertising circulars had been borrowed for use here; and after reading the whole section on water-closets, the architect or engineer would get only such information as might have been given in one or two pages of description and a single diagram. This is not a serious fault, but it has somewhat the character of "padding."

American practitioners must not be misled by the advice which this book, in common with most English writings on the subject, contains, so far as to adopt the strongly urged practice of placing the soil-pipe outside of the building, and of constructing water-closets against the exterior walls or in small projections. This is a good method in climates like that of England, where frost is little to be feared; but it is an accepted principle here that summer houses constructed on this principle cannot be occupied in winter without great annoyance from the freezing of pipes. In our view, the danger of the escape of sewer-gas into the house if soil-pipes and closets are centrally located is greatly overrated; always assuming that the material and joints of the soil-pipe are what they should be. A properly fixed soil-pipe of iron, with well-made lead joints, leading from an open top above the roof down through the house and out through the foundation wall, with a good current of air passing through it, is as sure to perform its office, without danger of changing the air of the house, as though it were carried up the outside of the building.

In treating of the disposal of the sewage of country houses or public institutions having a great area of land attached, factories, villages, etc., Mr. Denton fully indorses all that has been said in these columns on the value of subsoil and surface irrigation as a means of disinfection. His commendation of Field's flush-tank is unreserved. On one point it seems to us he is not entirely right: subsoil irrigation, so far as the growth of overlying crops is concerned, is regarded as supplying its moisture at the roots, to be removed by evaporation,—comparing it with the now common practice of watering potted plants by filling with water the saucers in which the pots stand. The cases are not parallel. The water in the saucer of the flower-pot stands at but little distance from the *surface of the earth* in the pot until removed by capillary attraction and evaporation. Water delivered into the earth from irrigation drains settles away into the ground, its surplus being removed by gravitation, and its fertilizing impurities are retained for the uses of vegetation or oxidized by the air in the soil.

[1] Sanitary Engineering: a series of lectures delivered before the School of Military Engineering, at Chatham, Eng., by J. Bailey Denton, F. G. S. M. Inst. C. E., etc. E. and F. N. Spon, London and New York.

Concerning the use of the systems of deposition and chemical precipitation, as applicable to isolated dwellings, our author says, "At the least, they clarify without purifying the liquid effluent. As the time is at hand when clarification will not be regarded as the only proof of fitness required for the admission of liquids into running streams, it will be obvious that no occupant of a dwelling would be justified in adopting either subsidence or precipitation."

Cesspools he regards as "evils of the worst order." "If these are shallow, then the cesspool and its unseen outpourings, though relieving the occupier of the dwelling of considerable trouble for a time, will remain liable to all the objections to which common privy cesspits are admittedly subject. The 'dumb-wells' which the larger cesspools become have been adopted in a great number of places where the sanitary authorities of urban and rural districts have been unable or unwilling to cope with the disposal of the sewage of their districts; and wherever, as I have said, the ground water is shallow, the creation of a concentrated evil of the worst description has been the consequence. In instances where the subsoil is of a character not to absorb the sewage—such as a clay soil—as it has escaped from the cesspool, the occupier has been compelled to lift it to the surface, and distribute it by hand or hose over grass, arable, or garden land near at hand, or cast it away to a distance. This treatment is subject, however, to the irregularity attending all manual work, and generally results in a nuisance."

Mr. Denton was the engineer of the sewage disposal works at Merthyr Tydvil; and he points with satisfaction at the continued success of the system of intermittent downward filtration at that place. He gives it as a general rule for practice, that where only a limited area is at command, an allowance of one acre per thousand persons "will be sufficient for the perfect cleansing of the liquid refuse discharged, while some return in the shape of vegetables from the land so used may be obtained. If, however, the surface be unlimited, the sewage may be applied by way of surface irrigation in the proportion of one acre for one hundred persons, with the probability of a larger return from the vegetables grown than in the other case. Any quantity of land between these two extremes which the circumstances may prescribe may be utilized with satisfactory effect."

Drains passing under dwellings should run completely through from outside to outside, with a ventilating opening at each end, so as to secure the passage of air from one end to the other. This method is based upon sound principles, applicable in all cases where no danger is to be feared from frost, and where there is no danger that the openings will deliver foul odors at points where they may become objectionable.

Considerable space is given to the description and illustration of systems for "disinfecting" the soil-pipe and sewer by an open grating outside of the house wall. In our view, this system is wrong in principle, as it is unnecessary. As above stated, the soil-pipe should be so tight as to allow no possibility of the escape of its gaseous contents in the house, and both sewer and soil-pipe should be so ventilated that there can be no danger of the formation of poisonous gases within them.

The use of the earth-closet for circumstances to which it is applicable is strongly recommended; and the usual unsatisfactory and inconclusive dissertation upon the vexed and undetermined subject of ventilation is given.

Concerning the water supply of country houses not much is said that is new or important, though this section is replete with information as to detail, and well worthy of the study of professional men.

THE ILLUSTRATIONS.

CHURCH OF OUR LADY OF PERPETUAL HELP, BOSTON, MASS.

MR. WILLIAM SCHICKEL, ARCHITECT.

(346 Broadway, New York, N.Y.)

THE work on the Church of our Lady of Perpetual Help was begun in the spring of 1875, and at the present rate of progress it will be ready for occupation by the end of the current year, although the towers will not be carried to their full height for some time thereafter. The style is Romanesque of the latter end of the twelfth century. In form it is a basilica with transepts. The extreme dimensions are, from front portal to rear of apse, 215 feet, and across the church at the transepts, 115 feet. The body of the church proper has a width of 78 feet. The material of the exterior will be Roxbury stone with Quincy granite wrought-work. The nave has a width of 40 feet, and a height in the clear of 70 feet. At the intersection of the nave and transepts, an octagonal dome will rise to an interior height of 110 feet. In plan, the lower story, entering from the rear of the church at the street level, will be used as a chapel for confessionals and other church uses. The height here is 18 feet, with a seating capacity of 1,500. The body of the church above will seat 2,000, while the full capacity will far exceed this. The arcades and clerestory walls will be carried on polished Scotch and Quincy granite columns, with caps and bases of Dorchester stone. Of these columns there are thirty-four in all. The tracery and rose windows will also be wrought in Dorchester stone. The sanctuary is semicircular in plan, and

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is forty feet in diameter. In the western transept, a lady chapel will be arranged. Seven altars in all will be found on this church floor, while beneath the aisles additional alcoves for confessors are arranged. It is to be a mission church, under charge of the Redemptorist fathers; hence the union of great seating accommodation with many confessionals. The triforium will be real, that is, will form a veritable passage about the church, passing around the dome, and also about the apse. A complete circuit of the church may be made by this passage under the aisle-roof. Above are the clerestory windows, as shown in the drawing. To the cross at the front apex of the nave-roof, the height is 106 feet, and to the top of the dome 154 feet. This dome is double, an exterior one of metal, with an interior wooden construction. The apse will derive its light through the windows of the dome. In the rear of the church, adjoining the apse, will be built a double-story building containing quarters for the sacristy and library of the priesthood attached to the church. The interior throughout will be finished in stucco tinted to imitate Dorchester stone, but not lined off. About the apse, and on the wall over the sanctuary arch, will be fresco paintings, on a gold background, of the Transfiguration, and other incidents from the life of Christ. Beyond these, but little color will be employed. The floors are to be tiled with marble, and the windows glazed with cathedral glass in rich designs. The front towers will rise 200 feet. The cost of the finished structure will be $300,000.

DESIGN FOR A COUNTRY HOUSE FOR THOMAS DUNN, ESQ., NEWPORT, R.I. MR. C. F. McKIM, ARCHITECT.

(57 Broadway, New York, N.Y.)

HOUSE FOR MR. R. C. PRUYN, ALBANY, N.Y. MESSRS. POTTER AND ROBERTSON, ARCHITECTS.

(No. 52 William Street, New York, N.Y.)

This house, now almost ready for occupancy, is built entirely of brick, with the exception of such constructional parts as required the use of stone. Collaburgh brick in two tints of red, and moulded as shown, has been used for the face-work. The carving over the door and windows is of wood. In the gables the ornamental work is cement stamped while wet, the design being traced in by hand and die. Rolled cathedral glass, leaded in bull's-eye pattern, is inserted in the heads of the windows. The interior is finished in hard woods.

STORE AT WILKESBARRE, PENN. MR. BRUCE PRICE, ARCHITECT.

(841 Broadway, New York, N.Y.)

THIS design for a drug store was carried out precisely as the drawing shows. It was built last spring, of Baltimore pressed brick and Ohio stone. The stained glass transoms were furnished by Samuel West, Boston.

WOOD STAINING.

THE practice of staining woods is much less common in America and England than on the Continent, where workmen, familiar with the different washes, produce the most delicate tones of color and shade. Wood is often stained to imitate darker and more expensive varieties, but more legitimately to improve the natural appearance by heightening and bringing out the original markings, or by giving a definite color without covering the surface and hiding the nature of the material by coats of paint. The best woods for staining are those of close, even texture, as pear and cherry, birch, beech, and maple, though softer and coarser kinds may be treated with good effect. It should be dried, and if an even tint is desired, its surface planed and sandpapered. All the stains should, if possible, be applied hot, as they thus penetrate more deeply into the pores. If the wood is to be varnished, and not subjected to much handling, almost any of the brilliant mordants used in wool and cotten dyeing may be employed in an alcoholic solution; but when thus colored it has an unnatural appearance, and is best used in small surfaces only, for inlaying, etc. The ebonized wood, of late years so much in vogue, is in many respects the most unsatisfactory of the stains, as the natural character and markings are completely blotted out, and it shows the least scratch or rubbing.

The common ebony stain is obtained by preparing two baths; the first, applied warm, consists of a logwood decoction, to every quart of which 1 drachm of alum is added; the seconds is a solution of iron-filings in vinegar. After the wood has dried from the first, the second is applied as often as is required.

For the first named bath, some substitute 16 weight parts of gallnut, 4 of logwood dust, and 2 of verdigris, boiled in a sufficient quantity of water. The writer has seen a peculiar method of blackening walnut in use in Nurnberg. On one of the Pegnitz islands there is a large grinding-mill, turned by that classic stream, where iron tools are sharpened and polished. The wood is buried for a week or more in the slime formed by the wheels; when dug out it is jet black, and so permeated by silica as to be in effect petrified. Another way to ebonize flat surfaces of soft wood is to rub very fine charcoal-dust into the pores with oil. This works beautifully with the European linden and our own white-wood.

A brown mahogany-like stain is best used on elm and walnut. Take a pint decoction of 2 oz. logwood, in which ½ oz. of chloride of baryium has been dissolved. This gives also, when diluted with soft water, a good oak stain to ash and chestnut. But the most beautiful and lasting of the browns is a concentrated solution of permanganate of potash (mineral chameleon). This is decomposed by the woody fibre, and forms hydrated oxide of manganese which is permanently fixed by the alkali.

A simpler brown wash is ½ oz. of alcanna root, 1 oz. aloes, 1 oz dragon's-blood, digested in 1 lb. of alcohol. This is applied after the wood has been washed with aqua regia, but is, like all the alcoholic washes, not very durable. Aqua regia (nitro-muriatic acid), when diluted in three parts of water, is in itself a much used, though rather destructive, yellow. For a red stain, a decoction of ¼ lb. of logwood and ¼ oz. of potash in 1 lb. of water is used as the bath, being fixed by a wash of alum-water. For scarlet, use 1 oz. cochineal, 6 oz. powdered argol, 4 oz. cream of tartar in 12 oz. of chloride of tin (scarlet spirits). For rose color, iodide of potassium 1 part, water 12 parts, as a first bath; as second, chloride of mercury (corrosive sublimate) 1 part, water 40 parts. Indigo solutions give blue washes, and 1 part of verdigris to 4 parts of water the best green. Soft wood floors are well stained with ½ lb. turmeric, ¼ lb. logwood, 22 lbs. soap-boiler's lye, ¼ lb. potash, to which, after it has been boiled down to about 14 lbs. weight, 1½ lb. wax and 2 oz. of annotto are added. This is largely used in Germany as a substitute for paint, and keeps the floor in good condition for a year or more. As a curiosity, the bleaching of mahogany to the appearance of chestnut may be mentioned. This was once done to make a dining-room table match the other furniture of a room in which it was placed, and was effected by alcohol saturated with sulphurous acid gas. A solution of 4 oz. of sandarac, 1 oz. gum mastic, and 4 oz. shellac, in 1 lb. of alcohol, to which 2 oz. oil of turpentine is added, can be recommended as a varnish over stained woods. Boiled linseed oil should be rubbed into the pores before it is applied.

JOSEPH T. CLARKE.

CORRESPONDENCE.

CONCERT GARDEN. — THE STARR BUILDING. — MUSEUM OF SCIENTIFIC INDUSTRY. — THE EAST RIVER BRIDGE APPROACHES. — REMODELLING LOWER NEW YORK. — NEW POLICE STATION.

NEW YORK.

BROOKLYN is to have a summer garden and music hall somewhat on the plan of Gilmore's Garden, New York. It will be named the Mozart, and is to cover an area 50 x 150 feet at the corner of Fulton and Smith Streets; the front on the former street. The exterior of the building is to be in Colaberg brick. In plan, for a distance of 30 feet back, the entire front will be turned into a vestibule; here will be the bars, lunch-counters, cigar-stands, etc.; over this apartment a gallery is to be arranged, looking down upon the garden proper, which has an arched roof 40 feet high, and covering an area 120 feet long by 50 wide. Three entrances will open from the Smith-street side. The floor will have gravel-walks, shrubbery, and grass, with tables and seats to accommodate 2,000 people. Vases with exotics, hanging-baskets, and cages with song-birds, will be liberally provided. The ventilation will be carefully looked after. Fred H. Coles is the architect, and expects to finish the whole at a cost of less than $50,000, including a short tower at the street-angle. If these winter gardens or city summer resorts are to become common, it might be well that some more intelligent treatment than the present building of barns with curved roofs should be adopted.

Mr. George E. Harney's new Starr Building at Broadway and Twenty-fifth Street promises to be a genuine treat. In style, its pilasters and curved-headed windows, balustrades, and quaint bits of treatment recall the English mode of a century ago. It is but an alteration, an extension of the building up to the street-line, with the necessary building of a new façade. The material will be Philadelphia brick, white putty joints, with Newark-stone finish; of this last but little is used, some very good effects being secured by fancy brick-laying. There are four stories with a high basement. The front, 28 feet wide, is divided into three bays by pilasters. The windows will be of plate-glass below, with the upper parts filled in with stained glass in a variety of patterns. The window-openings are covered with flat brick arches, and the general effect is more like a private house than an ordinary store-front. The height to top of the brick parapet above cornice is 68 feet; and, with the exception of a false cornice or heavily-moulded belt-course on the line of the fourth floor beams, which Mr. Harney may unfortunately be compelled to put in metal, the front may be commended as an example to the architect-builders who pile up heaps of meaningless iron and brick along our thoroughfares. Within, Mr. Harney hopes to put in some solid wood panel-work.

Mr. Nelson L. Derby, one of the younger architects of the city, has an honest piece of brick and stone work in the St. John's Hospital, to be erected in Brooklyn by the Episcopalians. It is a small hospital of about one hundred beds, with a chapel so arranged that the ends of the several wards open into it, and admit the sounds of the organ and the service to the patients in their cots. There are three wards, one over another, with the first

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floor below cut up into private rooms. The plan pursued at St. Luke's, in this city, of having an outside corridor along the north side of the ward will be followed at St. John's. This corridor not only cuts off the bleak north winds, but affords a passage and secures additional privacy to the ward proper. As yet the plan is somewhat unsettled, although at the special request of the bishop, a few yards of masonry were laid, and a corner-stone provided and laid on last St. John's Day, although it is likely that the stone may be shifted. The object of the bishop, in calling attention to the project and stimulating subscriptions, was gained by the ceremony.

The Vaux scheme for a great museum of scientific industry has received several severe newspaper kicks, and finds nobody anxious enough for its establishment to get up any enthusiasm this hot weather. One layman's proposition is to roof in the aqueducts, and convert them into drill-rooms for the use of the militia. They are far more likely to remain as monuments of New York's financial unwillingness, or more correctly inability, to pay for their removal.

The greatest work of the season, which has engaged the attention of our New York architects, is that on the Approaches to the New York and Brooklyn Bridge, which have been finally decided upon. The plan pursued by the Bridge Company managers was to have designs prepared by Mr. Collingwood, the resident engineer, and by his several associate engineers; in fact, a limited competition within the office. Upon this work they have been engaged during a greater portion of the winter. Mr. Collingwood made his study as plain and unambitious in matters of detail as was possible. He depended upon the mass and the necessary constructive adjuncts to give an architectural character, without adding features not absolutely called for as part and parcel of the bridge construction. The other designs showed an endeavor at architectural effect beyond that growing out of a strict adherence to constructive demands, and they were so far false and weak. About two months ago, all the designs were submitted to an advisory commission, consisting of Joseph M. Wilson, a Philadelphia architect, George B. Post, and Napoleon Le Brun of this city. It was a carefully chosen commission, well qualified for the work laid before it, which was to determine upon such modifications of the engineers' designs, or substitutes therefor, as should embody a correct architectural expression with the rigid requirements of the engineering part of the work. It was a supplementary commission, to add grace to strength, beauty to utility. After close inspection and comparison, one of the designs prepared by Mr. Collingwood was taken as a basis of operations. On the New York side, from the river face of the anchorage to the outlet upon the street level at Chatham Street, the length is 1,548 feet, and in width 100 feet. The general design is a series of arches occupying the spaces between the several streets, over which the approaches pass by means of flat iron bridges.

It is the intention of the bridge managers to utilize these arched spaces below the roadway as storehouses and warerooms for heavy merchandise. Starting from Chatham Street, the Approach first passes over North William and William Streets, at a comparatively low elevation; and a change of grade will probably be made to accommodate the low headway of the flat bridges. A series of ten arches, of gradually increasing size, brings it to Rose Street; six more arches, and Vandewater is passed; five arches and Cliff Street is reached; and with four more arches the wide span of Franklin (139 feet) is passed, with an iron construction, now at a good height; one more large arched opening, and the anchorage face concludes the shore work; beyond that, the cables carry the road-bed up to the New York pier, and thence over the river span. The bulk of the material is of granite; quoins, base courses, voussoirs, and cornice, with balustrade above being in tooled work, as will also be the flat pier buttresses flanking the several street openings; the actual bearing-arches and vaults below are to be in brick, struck on semicircles, while the outer arches will be struck from a double centre, the general style being Florentine, without much elaboration of detail. The arched spaces will of course have all degrees of capacity; the smaller spaces near the ends of the road-bed will be used for the accommodation of the machinery which is to be employed in the working of the cars back and forth over the bridge. The arches range from fifty-five feet in height down to ten feet, or less; and in width from 28 feet downward. The want of parallelism of the streets compels the use of skew arches, and the work is further lightened by the opening of intersecting arches.

On the Brooklyn side, the architectural treatment is very similar; but the engineering difficulties, with changes of grade and irregular streets, make the arching below the road-bed resemble a complicated bit of mediæval vaulting. The length of the approach here is about nine hundred feet; and as on the New York side, the arched spaces will be used for warehouse purposes, iron floor-beams being carried across where the arches are high enough to make several stories. The cost of the entire work will reach two and a quarter million dollars.

The architects are promised a rich harvest if the aldermen can but carry out their notion of remodelling the metropolis. It reads almost like a burlesque; but Alderman Sauer, in private life proprietor of divers "beer tunnels," sets forth at great length and much seriousness, that, —

"It is obvious that the capacity of very many of the streets of the city south of Houston Street is totally insufficient for the convenience of the vast and constantly augmenting volume of business daily transacted;" that they are "narrow, tortuous, and laid out without system or regularity, with a view to the accommodation only of the sparse population and comparatively insignificant business of this city a century or more ago, when Wall Street was its upper or northern boundary, Maiden Lane was a rural valley road, Nassau Street the 'Pie-woman's street,' Chatham Street a part of the original road to Boston, Division Street the dividing line or lane between the Delancey and Rutgers farms, Broadway above Wall Street was a country road leading to the 'Commons,' and Greenwich Street the shore road leading to a small village; and the intersecting roads or streets were laid out and established as the wishes and interests of the individual owners of the land through which they passed dictated, and without any regard to their uses by the people generally or for business purposes." It was further declared that "unless ample provision is made to accommodate and facilitate the business that centres on these lines of travel and avenues of trade and traffic, new locations will be selected outside of our city limits. . . . The business that cannot be transacted here will betake itself to other locations." It was declared to be "fortunate perhaps," that under section 105 of the new charter of 1873, the Board of Street Openings and Improvements, consisting of the Mayor, Comptroller, Commissioner of Public Works, President of the Department of Parks, and the President of the Board of Aldermen, are vested with the authority "to begin at once a project for improving the lower part of the city."

The resolutions accompanying the preamble requested this Board "to meet as soon as convenient and take into consideration the propriety of laying out anew all that part of the city south of Houston Street; the project to include the widening of the streets fronting the water (West, South, and other streets) sufficiently to provide for the convenient transaction of the immense freight, passenger, and other business of our water-front for all time to come; to provide for the laying out of a continuous avenue or 'boulevard' around that part of the city at a convenient distance, say three hundred feet, from the streets fronting on the water, and one or two wide avenues or boulevards through or near the centre of the island, connecting all such new avenues or boulevards with some of the avenues established by the Commissioners appointed under the act of 1807 for laying out the city north of North (now Houston) Street, utilizing existing streets and avenues where possible in the construction of the proposed new thoroughfares; that in this new scheme the error committed by the commissioners in 1807 in laying out wide avenues, running lengthwise of the island, at great distances apart (from six hundred to nine hundred feet), and streets running crosswise of the island every two hundred feet, be avoided, and with the exception of the new avenues or boulevards above alluded to, reverse the system then adopted by laying out wide streets, at less distances apart, crosswise of the island, or from east to west; and streets not more than two hundred feet apart, lengthwise of the island, from north to south. The width of such streets to be as determined upon by the Board of Street Openings and Improvements."

Another resolution provided that the Board, if it deemed advisable, obtain the sanction of the people of the city before undertaking a work of such magnitude, by submitting the question to them for their approval or rejection at the next or subsequent general election. The whole matter was referred to the Committee on Streets.

Before these budding Barons Haussmann begin their grand work, a sober second thought will no doubt bring the reflection that while all this grandeur is being carried out, New York will be lost forever, and what commercial power she does possess will be most thoroughly stamped out, and a bankrupt plain of dilapidated houses alone remain to mark the spot where once stood the Empire City.

The police of the city have just acquired a new station-house. It stands on Fifty-first Street near Third Avenue, and has been talked of as a model of its class. The plat measures 35 x 100 feet. The station proper is five stories in height, and runs back 62 feet, with an air-shaft on either side, giving the plan a dumb-bell shape. The jail building, which measures 28 x 30 feet, fills the rear end of the lot. On the first floor, besides the public office, are the captain's and sergeants' private rooms, and a general waiting-room, which, with two great sinks, answers as well for a general washing-room for the officers. Above this floor, the plan is repeated on each story of a large dormitory, front and back, with a small double-bedded room opening off the hall. Thus accommodations will be furnished for 105 men and officers. The finish throughout is of pine oiled and varnished, the wainscoting running high and filled in with narrow stuff set diagonally. A peculiarity is, that, above the first floor, the building is utterly unprovided with either water or heating facilities. This was by express orders of the police. The prison is a low, brick, fire-proof building, extending across the rear of the lot: an open slat-work bridge from the first floor of the main building leads to the second floor of the prison, while outside stairways lead down to the lower story of the prison and up to the vagrants' lodging-rooms above. From heavy bearing walls, the floors are carried on iron beams filled in with brick. The floors and ceilings are then lined with one-quarter inch boiler-iron plates carefully jointed. The cells are built up in the same way, except that the plates are set double and filled in with brick. The cells measure each 4 feet 4½ inches by 8 feet deep by 9 feet high. The entire fronts are of one-inch iron bar crib work, half the space being occupied with the door in the same style. A specially constructed Yale lock will relieve the jailer from carrying the great key, which has heretofore been looked upon as the mark of his office. There are twenty cells, each one having water accommodations and a broad wooden plank for a resting-place. The lodging-rooms provided for the tramps are one chamber 14 feet 8 inches by 19 feet for males, and another 13 feet 6 inches by 19 feet for females. The floors slope to a trap at the centre, and, with the hard lining, will permit the rapid cleaning of the whole place by a liberal use of a hose and a good head of water. Exteriorly the red brick and granite finish remind one of the *Tribune* building; but across the building, sixty feet from the curb, at the line of the fifth floor beams, a meaningless cornice is carried. It was intended, no doubt, to break the height and relieve the impression which would otherwise be given of stiltiness. The building will cost about $50,000.

OIL LAMPS. — The *Building News* asks why the use of oil lamps has been prohibited in Trinity College, Cambridge.

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THE VICTORIA DWELLINGS.

ON Saturday last, the Earl of Beaconsfield opened the blocks of dwellings at Battersea, erected by the Metropolitan and Laborers' Dwellings Association, which, at the desire of her Majesty, are for the future to be known as "The Victoria Dwellings."

The buildings comprise three blocks, containing 456 rooms; viz., one block for artisans' dwellings, in self-contained tenements of three, four, and five rooms each, and which contains 98 such tenements, and it is supposed will house about 500 persons; and two blocks for laborers' dwellings, containing 152 rooms, to be let as single rooms, or in sets of two or three together, and will, it is supposed, house about 350 to 400 persons. Laundries are provided in separate buildings for use of inmates in rotation as may be arranged by the resident superintendent from time to time.

The object proposed to be attained is to give the tenants the utmost space and convenience in their dwellings that is possible, having regard to the weekly rents they may be, according to their class, able to pay, while still providing a sufficient return for the money invested by the shareholders. It should be remembered that the chief object of the association is to provide for that large class of laboring operatives who are below the artisan class. The areas of floor and cube space in each room of the artisans' block of dwellings at Battersea are in excess of those for a similar class erected by the best of similar societies, and therefore the rents obtained should be at a somewhat higher rate. They have been fixed, therefore, at a very slight increase; and no difficulty has been found on this account in obtaining good tenants.

In the artisans' tenements the sitting-rooms have an area of about 150 feet each; the bedrooms about 100 feet each, and are eight feet clear in height. The kitchens are supplied with water supply, coal-bins, shelves, and necessary closets and fittings, and open into balconies. A w.c. is provided for each tenement, approached only from the open-air balcony, and with special cistern service and constant supply of water. In the laborers' tenements the rooms are of various sizes, from 85 feet to 180 feet superficial floor area, so arranged as to be capable of combinations of two or three to be let together if desired, and having a clear eight feet in height. All the larger rooms are fitted with sink and water supply, and closets for coals and stores. The w. c.'s in these blocks are approached from a passage transverse to the building and open at both ends, of easy access to the staircases on each floor, thus insuring separation from all dwelling-rooms, and a constant free current of air. Dust-shoots are provided on all floors of all the buildings. None of the rooms or suites of rooms have windows overlooking any other suite.

The staircases to the artisans' tenements are all placed at the back of the blocks fronting to thoroughfares, so as to give the full advantage of front windows to all the rooms. In passing from the staircases to the entrance-doors of each suite, no room-window is passed, and thus perfect privacy is obtained to all rooms of every suite. All the w.c.'s are shut off from the suites, and have a covered access, but through the open air, and all have windows to the open air; all are separately supplied with water-services, instead of trusting to the overflow from the adjoining scullery sink, as is done in buildings of a similar description to these, but with very unsatisfactory results as may be supposed; they are divided by brick walls (not wooden partitions only) from the dwellings, and are fitted with an excellent strong and simple apparatus, specially contrived by Mr. George Jennings of Palace Wharf, Lambeth, and which is much superior to the common pan-apparatus used in general. They are also all fitted with a separately-hinged cover, so that they may be used as slop-sinks by raising the cover; and thus cleanliness, when they are so used, can be insured.

The living-rooms are fitted with cooking-ranges having oven and boiler for hot water attached, instead of range and oven only as is frequently the case; hot water can thus be always had without lighting a second fire under a copper in the scullery, as is elsewhere necessary, and is complained of by tenants as expensive to them in fuel, and also as being less convenient.

Separate ranges of wash-houses for the sole use of tenants, and drying-grounds, are provided. In the dwellings of some kindred associations, the tenants wash in their rooms and dry on the flat roof of the buildings. Washing in rooms is, however, strictly forbidden at Battersea, being thought prejudicial to the health of the adults and children living in the rooms, besides occasioning dirt and inconvenience.

All drains are of course taken outside of the buildings; they are not directly connected with the sewer, as is too common with even the best London houses, but are all intercepted by a specially-contrived earthenware cess-trap, patented by Mr. George Jennings, which is open to the air and admits of being easily inspected and cleaned out from the surface. There is no direct connection between the waste-pipes from the sinks and the drains. All the soil-pipes of w.c.'s are open to the air, being taken above the roofs of the buildings. Thus all chance of sewer-gas finding its way into the dwellings is obviated as far as is practicable. All windows are made to open top and bottom as sashes, thus insuring ventilation when desired by the inmates.

The rooms are all rectangular, without projections or irregularities of shape, thus insuring the advantage of the floor area of the rooms to the fullest extent. Constant supply of water has been arranged for, so that the cisterns are always full. Balanced self-closing taps are fitted to all sinks to prevent waste from taps of the ordinary sort which may be left running. All the sinks are of galvanized iron. All passages and staircases are lighted by gas from lanterns so contrived in the thickness of the staircase-walls as to be out of risk of damage, and which light the stairs on one side and the landings on the other. Gas is not laid on to the rooms. All staircases and passages are wholly of fire-proof material.

All the buildings have been designed by Mr. Charles Barry, F.S.A., President R.I.B.A., who is the architect to the association.

The blocks of laborers' tenements referred to in the description consist of buildings in two parallel ranges — facing each other, and designed on what is called the balcony system; that is to say, balconies carried by iron columns run along the front of each range, and give access from the staircases to the different tenements. These blocks are four-storied, substantially built of stock bricks with one or two bands of a lighter color; they have projecting eaves, and are tiled with Mr. John Taylor's patent tiles. In general character and in arrangement they do not differ widely from what has already been erected on the balcony plan by other companies; and perhaps the chief distinction between them and some existing dwellings which are acknowledged to be successful is, that the closets are more immediately within reach, a circumstance which is both an advantage and a disadvantage. The rooms are plastered and papered; they have grates and ranges which appear to have been made purposely, as they bear the monograms of the association, and in which the metal is somewhat lighter than we should have preferred for the purpose. The railings of the balconies have also apparently been cast to a design, and are neat but not elaborate. The window heads and sills and treads of stairs appear to be of Mr. Allen's material (concrete made with Portland cement and a proportion of breeze), or something very like it; and the windows, which are sashes double hung, have all of them a contrivance which, if we mistake not, Mr. Allen was the first to introduce, for the protection of flowers grown in pots on the window-sill. The lower sash is divided, and the lower part of it is not hung, though it can be raised when wished, while the upper part fits on to the lower one with a rebated joint. Of course there is considerable risk of leakage at this joint if the window be in an exposed situation; but for its purpose, viz., a protection to outside window-gardens, the contrivance seems well suited.

In the block containing what are called the artisans' tenements we meet with more novelty. The buildings are similar to those just described in material and roofing, and are also four-storied, but there is no balcony. They form a hollow square, a somewhat undesirable arrangement, and the tenements are approached from open staircases not dissimilar to those in many of Sir Sydney Waterlow's buildings. The greatest peculiarity, and one to which serious objection was taken by some of those who examined the dwellings on the opening day, is that each of the blocks of which the quadrangle is composed is divided by a wall running from end to end in the direction of its length, and almost entirely without openings, so that at no point can the air blow through from front to back. In fact, the buildings consist of a series of small "back-to-back" tenements. We are not disposed to lay very great stress upon this defect, as it is to a large extent neutralized by the happy arrangement of the plan with regard to closets, etc., and by the ample size of the windows. Still the facts remain that from each landing of each staircase access is obtained to two tenements looking inwards towards the quadrangle, and to the others looking outwards, the tenements are back to back, and that their centre is a quadrangle. The danger, if that exist, due to the said causes, might be to some extent remedied, and with great ease, by making the staircase open from back to front; and were this done, the objection which exists to all quadrangles surrounded by lofty buildings of uniform height, namely, that they are very apt to become full of stagnant air, would, to no inconsiderable extent, be overcome; while that to the back-to-back arrangement would be, at any rate, diminished.

The arrangement of one of these three-roomed or artisans' tenements is, that it is entered by its own distinct outer door from the landing, giving access to a short passage. Out of this opens first the scullery, and then the bedroom; and at the end of the passage is the living-room. The closet is reached from the scullery. The floor area of the rooms will be found in the description already alluded to. Each of them has a fireplace. In the long room is a cupboard, in the scullery a coal-bunk and a cast-iron sink, and each has one sash window of the sort already described. The best feature of the plan is the approach to the closets. This is managed with much simplicity; so that, at a very small sacrifice of space, a lobby, more or less open to the external air, is passed in going from the scullery to the convenience, and the entrance of foul smell from the closet is cut off in a very effectual manner. — *The Architect.*

A NOVELTY IN COMPETITION. — The Ayr (Eng.) Town Council, in the competition for the new town hall, intend to give a premium of £25 to each architect whose design is rejected, while the accepted design is paid for in the usual way. It is barely possible that this may prove a somewhat costly competition for the town of Ayr.

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NOTES AND CLIPPINGS.

ART STUDENTS' LEAGUE. — The Art Students' League will re-open its several schools of art on the first Monday in October next. The facilities for art study provided in these schools, which are supported wholly by the students of New York, are as follows: Three life classes daily and a school in portrait-painting, together with composition and sketch classes, are kept in continuous operation for eight months of the year. In addition to these lectures on anatomy, perspective, and composition, will be given during the coming season ; and new classes will be formed, with increased hours for study, as rapidly as the attendance will warrant. The League classes already afford greater opportunities for study in the higher branches of art than have been supplied hitherto by any schools in America; and the students aim to establish permanent schools with advantages similar to those of Europe. Mr. Walter Shirlaw has been engaged as professor of drawing and painting for the coming year. Application for admission to the classes or membership may be made to the secretary, No. 108 Fifth Avenue. The president of the League is Mr. Frank Waller.

A NEW CATHOLIC COLLEGE. — The building for the new Catholic College at Jersey City will be built on four lots, 102 feet deep, adjoining St. Peter's Church. The building facing the street will be used as a residence for the fathers and the college professors and tutors, and will have a frontage of 193 feet and a depth of 30 feet. The college building in the rear will form a T, and will be 53 feet by 65 feet in dimensions, with a yard on each side 17 feet wide. The buildings will be five stories in height, with a basement built of Philadelphia brick, relieved in front with Newark brown stone. The residence will have an entrance in the centre, one on the east side for students, and one on the west side for guests. The chapel will be on the second floor of the college, with the library over it on the third and the museum on the fourth floor. The refectory will be in the basement of the residence ; and the floors above the president's room and parlors will be divided into sleeping-apartments. The class-rooms will be in the college building. The college and residence will be separated by a corridor, and the residence will be connected with the vestry-room of St. Peter's Church. The plans were drawn by Mr. L. O'Connor.

A NOVEL AMERICAN EXPORT. — It is said that Jabez W. Abbott, employing mason of Passaic, has received orders from R. Neill & Sons, builders of Manchester, England, to send between 200 and 300 skilled carpenters and joiners to Liverpool. Every man must have a complete kit of tools. Steady work is to be guaranteed to good men. Wages are at the rate of 8½*d.* an hour ; fifty-one hours a week is the working time. Of 150 masons who went over last year, only six have returned to this country.

A RUSSIAN APPOINTMENT. — It is reported that Mr. J. J. R. Randall, a Rutland, Vt., architect, has decided to accept the position offered him by the Russian Government as superintendent of the construction of railroad bridges in the empire at a salary of $3,000 a month.

BRIDGES CONDEMNED. — The iron bridges just erected by the Canton (Ohio) Iron Bridge Company over the River Raisin, near Adrian, Mich., to replace those swept away by the freshet, fail to pass inspection. Prof. Davis, Engineer of the Faculty of Michigan University, declares them inferior to the specifications, and unsatisfactory if not unsafe.

A WISE DECISION. — At a late meeting of the New York Board of Health, a communication was received from the Board of Police in respect to a proposition from a firm of disinfectant manufacturers to disinfect the garbage and street dirt, with a mixture of carbolic acid and copperas, at the place of final deposit, and requesting the opinion of the Board as to whether the garbage and street dirt so treated is suitable for filling-in purposes within the city limits. The Board decided that the disinfection of the material with the preparation referred to renders it less offensive, and that it may be safely used in the filling-in of bulkheads and docks; but it cannot, they say, be safely used in localities likely at any time to be occupied by dwellings or factories.

THE PEABODY MUSEUM AT NEW HAVEN, CONN. — The first wing of the Peabody Museum at New Haven, opened a short time since, is built under the trust-deed of 1866. This gave to the Trustees $150,000 "to found and maintain a museum of natural history, especially in the departments of zoölogy, geology, and mineralogy." Two-thirds of the whole sum was to be for the building, $30,000 for a fund for care of the building and increase of the collection, and the remainder to be placed at interest for the completion of the building, after the construction of the first wing.

THE STONE-WORK OF THE CHICAGO CUSTOM HOUSE CRUMBLING. — It is stated that the stone of the Chicago Custom House, not yet completed, is already showing signs of time, and is crumbling and scaling. The fact is confessed by all who have any connection with the building, and it is feared that nothing can be done to preserve it. It is probable that the Smithsonian Institute will be applied to for the purpose of securing, if possible, some preservative for the stone.

PERFORATED BRICKS. — Bricks perforated with three holes, that the mortar may get a good hold, are being used in the construction of some buildings in Minneapolis, Minn.

BURNING OF DETROIT THEATRE. — The Théatre Comique was burned on the morning of July 23. The loss is $10,000: fully insured.

THE RETORT COURTEOUS. — Madame de Stäel's apothegm that architecture is frozen music has been returned in kind by Herr Hegel, who calls music "architecture transferred from space to time."

AN OBSERVATORY DOME. — The authorities of the College of New Jersey, at Princeton, in that State, have decided to substitute a wooden dome for the present iron structure upon their astronomical observatory, because of the confusion of magnetic currents occasioned by that material. It was agreed that a boat-builder would be the best person to make it, as it is to be composed of lap-work; and Mr. James Beetle, a veteran boat-builder of New Bedford, Mass., has already begun upon the model. The dome is to revolve on iron balls, operated by machinery whose motion is regulated by a clock-work attachment. It will be constructed of oak, maple, chestnut, and cedar, copper fastened, and divided into equal sections by fourteen chestnut ribs, rising from the base at intervals of about four feet, and meeting at the top. The outside will be covered with cedar clapboards, showing four inches and lapping seven-eighths of an inch. The dome will be eighteen feet in diameter: the base, to a height of ten and five-eighths inches, is perpendicular.

THE DECORATION OF ST. PAUL'S. — In Harrison's "History of London" is the following statement unsupported by any quoted authority: "As Sir Christopher was sensible that paintings, though ever so excellent, are liable to decay, he intended to have beautified the inside of the cupola with mosaic work, which strikes the eye of the beholder, and, without the least fading of colors, is as durable as the building itself; but in this he was unhappily overruled, though he had undertaken to procure four of the most eminent artists in that profession from Italy."

FAILURE OF A BRIDGE. — On the 27th ult. a disaster similar to the one which recently occurred at Bath took place at Saltash, Eng., fortunately not causing loss of life. It being Coronation Day and also regatta day, the steamers running between Devonport and Saltash were crowded; and when the last steamer arrived alongside of the landing-stage, some hundreds of persons crowded at once upon the narrow wooden bridge which connected the stage with the shore. Their weight was sufficient to burst the bridge in two, and the impatient crowd were dropped into water which fortunately was not deep enough to drown them.

CHURCH TREASURE IN PARIS. — The City Tribunal of the Seine gave judgment recently in a suit to decide a disputed claim between the city of Paris and one of the churches as to the ownership of the furniture and treasure of the sacred edifices. In the loft at the Church of St. Gervais, in Paris, there had been lying for many years five pieces of ancient tapestry, forming part of a series representing the legend of that saint and St. Protais. The council of that sacred edifice recently sold these relics for a sum of $1,600 to a dealer in curiosities named Recappé; and the latter afterward disposed of a part of them to M. Camondo. The city of Paris, learning of what had been done, sent a letter to demand an explanation, but to which the council did not even reply, denying the right of the city to interfere in the domestic affairs of the church. The present suit was then instituted to have the tapestry restored, on the ground that the property belongs to the commune and not to the church, and that the latter has only the use of it, and not the right of disposing of it. A verdict in that sense was given: the church council was ordered to return the purchase money, and the present holders of the tapestry to give it up to the city of Paris.

RESTORING FRESCOES IN A FRENCH CHURCH. — There are some remarkable frescoes by Flandrin, in the Church of St. Vincent de Paul, Paris, which, having become defaced by accumulations of dust, are to be restored. M. Lemain, a well-known painter, has a number of workmen upon them, who are cleaning them with bread-crumbs. This fact recalls Sigalon's attempt to restore Michael Angelo's picture of "The Last Judgment" in the Sistine Chapel at Rome. He employed bread-crumbs ; and this gave the cardinals, who were really opposed to the work, an opportunity to have it interfered with. The lower part of the picture was almost completely obscured with the smoke of the candles burning night and day in the chapel ; and the artist's application for leave to restore them being supported by the French ambassador, consent could not very well be refused. The delivery of a quantity of bread for the purpose resulted in a riot, however, the mob protesting against being robbed and starved. This was made the occasion for a cessation of work upon the picture.

EXCAVATIONS AT ELEUSIS. — The Archæological Society of Athens, which during the last year has been occupied so successfully in the excavation upon the south side of the Acropolis, is understood to be making arrangements for the purchase of the villagers' houses now standing within the area of the great temple at Eleusis. If the arrangements prove satisfactory, excavations on a large scale will probably be begun next season. Among other plans spoken of at Athens, is the excavation of the east and north sides of the Acropolis.

PROTECTION AGAINST LEAD POISONING. — Workmen employed in the manufacture of white lead are always liable to lead poisoning, both by inhaling the dust and in touching the lead with the hands. Various correctives for this have been employed, and among these the latest and most simple is a careful washing of the hands in petroleum. Three washings a day are reported to be sufficient to prevent all serious danger of poisoning. The benzole in the petroleum is said to scour the skin and remove the dust of lead, and the fatty substance in the oil prevents the absorption of the lead salts. The experiments made with petroleum used in this manner give such good results that it is proposed to use the same material as a guard against poisoning in other industries where the salts of copper or mercury are employed.

WATER-TIGHT CEMENT. — It is said that a good waterproof cement is made by dissolving five parts of gelatine in hot water, and adding one part of chromate of lime. The cement must be kept in vessels which are well shielded from light.

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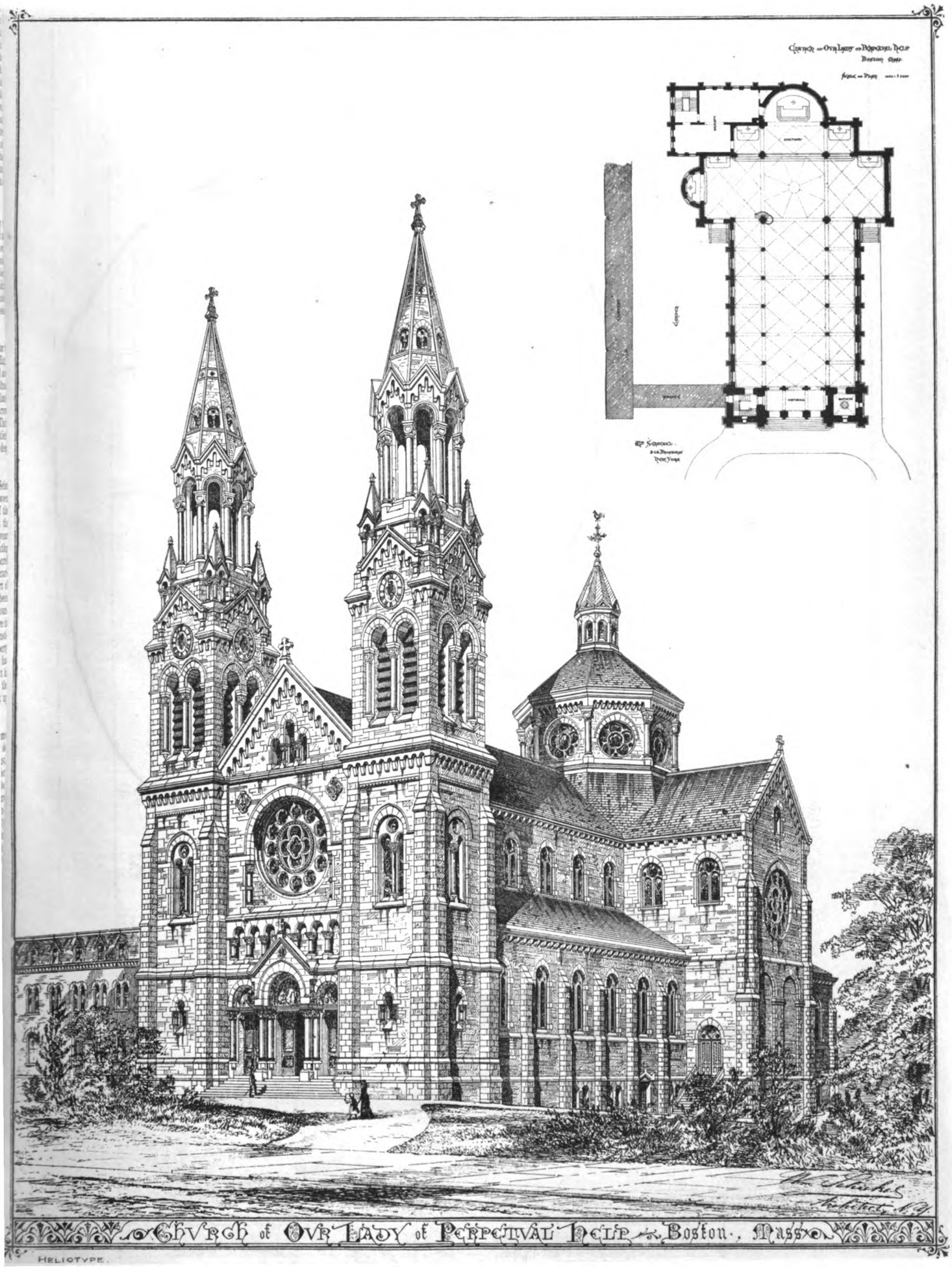

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Front Elevation Of House For Mr. R.C. Pruyn, Albany, N.Y.

POTTER & ROBERTSON, ARCHITECTS, NEW YORK.

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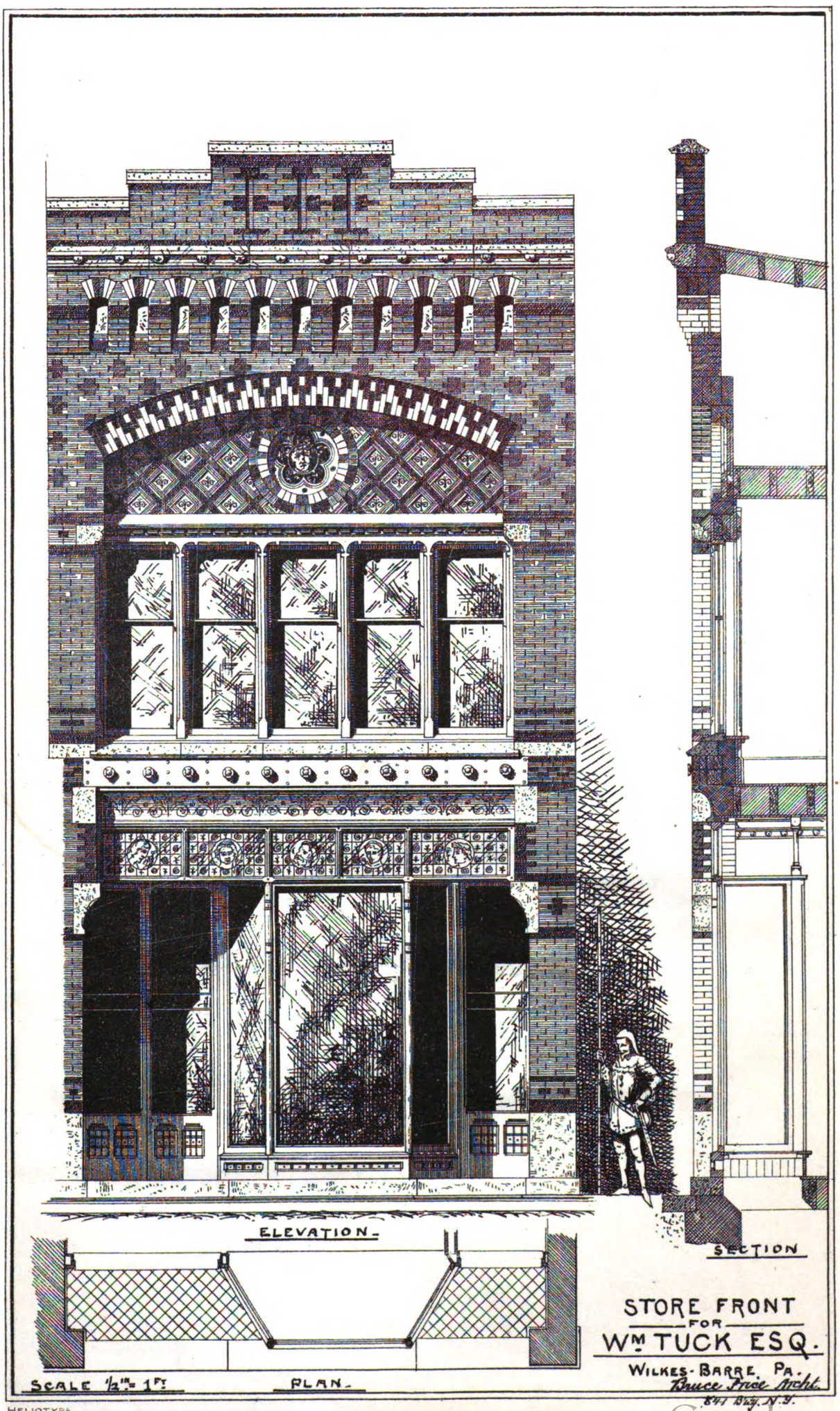

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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THE great Old World discovery that labor, by refusing to labor, can inflict upon capital such loss and disaster as to force the standard of wages to a higher level, has been completely overshadowed by the modern American device, whereby the same end is apparently to be obtained with far greater circumstance and effect by blocking all the wheels of commerce, and stopping the trains upon the railroads. The first practical application of this bold invention has indicated that unlawful combinations of dissatisfied train-hands may at a stroke bring about results as disastrous to the nation as the invasion of a foreign enemy, and fill the land with sounds and portents of war. We are too familiar with the operations of mechanics' strikes at home and abroad in their effect upon building operations and building trades, and with the various contrivances, such as forced limitations in hours of labor and in employment of apprentices, the arbitrary subdivisions of trades, and the equalization of wages among skilled and unskilled, whereby the trades-unions, which are forms of communism, assert control over the masters in a manner really hostile to the best interests of the working-man. We know that in certain places the unions fine a laborer for carrying more than a given number of bricks in his hod, or a bricklayer for laying other than a certain kind of bricks; that stone-masons are not allowed to lay a brick, and bricklayers are not permitted to lay a stone; that masters are frequently forbidden to work at their own trades with their own hands; we know of the late Doulton strike, for example, in which all the bricklayers stopped work for several months because two skilled workmen, not bricklayers, were employed to lay up certain ornamental parts of the terra-cotta; we know moreover that contractors, subject as they are at all times to arbitrary limitations from their journeymen as to the manner of fulfilling their obligations, and to tyrannous dictation as to wages, frequently decline to take time-contracts without an extravagant margin of profit to cover such contingencies. But these difficulties, although they have hitherto defied the efforts of political economists to adjust them by any system of arbitration capable of general application, are of minor importance as compared with the last great movement which has involved interests infinitely greater and more extended.

WE can conceive that the leaders in this last and greatest of all strikes little realized how dangerously successful their enterprise would be. They not only embarrassed the railroad companies against which their unlawful schemes were primarily directed, but through the strange complications and entanglements of modern society, inflicted grievous loss and distress at many unexpected points far and near, directly and indirectly, present and future; moreover, they aroused a riotous following, which killed, burned, robbed, and destroyed in every direction; so that suddenly they found themselves opposed by all the force of civilization, against which they at last discovered they could make no headway. They have succumbed; and the utmost limits of their disorganizing power having been by this experience distinctly defined, once for all, we believe society will profit by the lesson, and provide commensurate means to protect itself against any possible repetition of the evil,— in this shape at least. Our capacity to provide remedies for any forms of social disorder, or for any abnormal developments of crime, as soon as they have become powerful enough to inflict public disasters, has been heretofore repeatedly tried, and not found wanting. We shall have no more such combinations of laborers and mechanics, with the idle and dangerous classes behind them, against the common welfare,— no more social wars of this kind. Now that we know what they are, we can provide a remedy. But if injustice against labor really exists, and if at the bottom of the turmoil there lies the evil of insufficient wages or unfair exactions of any kind against the working-man, the remedy for this is not so easily found.

WHO is to arbitrate between employer and employed? By what principles is the arbitration to be guided, and how is the arbitration to be enforced? A court of appeal in cases between classes whose interests are so widely divergent must, humanly speaking, be free from the possibility of bias. No existing courts could serve the purpose, as their judges are popularly supposed to belong to a class naturally out of sympathy with labor as opposed to capital. Each party is prompt to combine and organize against the other. It would seem at first sight that in this facility for organization may reside a means of safety. Let these organizations be defined and protected by law, and entitled to elect a permanent commission of arbitration, paid out of public funds; let the only appeal from the decisions of this tribunal be to the final courts of law, and let such decisions be enforced by law. Does it not seem that the accumulation of difficult cases before such a tribunal would indicate the points needing legislation, and that in course of time there would be created a body of laws sufficient to meet every emergency of dispute between capital and labor, and prevent injustice and tyranny on the part of either toward the other? The principles of arbitration are much better understood in England than here, and are frequently put into practice with excellent effect. The subject has received the earnest attention of publicists like Mr. Hughes and Mr. Mundella, and there has been considerable parliamentary legislation on the subject, the records of which might be consulted with great advantage to ourselves, as the conditions in the two countries cannot greatly differ.

IT is common to say that the rate of wages, like that of all other prices, must be governed by the law of supply and demand. Of course, if the supply of laborers is great and the demand for them small, wages must be low; if the supply is small and the demand great, they must be high; and so on. But it has been found in modern times that wages do not adjust themselves to these natural fluctuations without a conflict of classes. If wages ought to rise, and capital is unwilling to accept the condition, the laborers are justly outraged; if they should fall, and laborers will not submit to the reduction, capital in turn is in trouble. It is a continual epic of sorrows, with a background now of starvation and distress to labor, now of bankruptcy and financial ruin to capital. If a tribunal of arbitration could be formed, which should have the respect of both parties, it seems natural to suppose that its decision regarding the adjustment of wages would go far towards alleviating these sorrows, and would certainly remove the sense of wrong and oppression and all incitement to acts of rebellion or tyranny. These suggestions of course refer mainly to the building trades and manufactures; they are made more for the purpose of eliciting discussion among those who are most intimately concerned with the employment of labor than with any hope of presenting in a word any thing like a final demonstration of a problem so difficult and so intricate. Architects are frequently called upon to act in a sort of judicial capacity in certain minor cases of difference between labor and capital, and perhaps by experience are in a position to discuss this question with intelligence and effect.

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THE commission appointed to erect a new Hospital for the Insane, for the South-eastern District of Pennsylvania, invite in our advertising columns a general competition of architects as a preliminary to this object. The programme of requirements includes plans for an extensive range of hospital buildings of various kinds, for at least seven hundred and fifty patients, with large separate accommodations for administration, officers' dwellings, an amusement hall, laundry, kitchen, bakery, boiler-house, gas-house, water-works, workhouses, laboratory, and lodgings for employees; together with complete schemes for heating, ventilation, and drainage; the whole to cost not more than six hundred thousand dollars. At least six sheets of drawings are required in addition to the specifications and estimates, and these are to be presented on or before Sept. 8, 1877. The authors of the five selected plans are each to be paid three hundred dollars in full for such plans, specifications, and estimates, and from among *all* the competitors one or more are to be chosen as architect or architects of the hospital, "provided the commission deem it to be in the best interests of the work to make such appointment." Admitting that a general competition is necessary, the commissioners are of course bound to avoid committing themselves to any perilous promises as to the ultimate selection of their architect from among the competitors; for it is evident that among the great crowd of unemployed architects, draughtsmen with little experience, and students with none, with whose plans and schemes the commissioners have thus prepared to embarrass themselves, there will be few — more probably none — to whom they could properly intrust interests so important and so complicated. On the other hand, in the absence of such promises, it is equally evident that no architect of repute and experience, to whom such interests could properly be committed, would venture upon such a forlorn hope as this programme holds forth, unless he had reason to believe that he had personal "influence" of some kind with the commission or certain members thereof, which "influence" might in some irregular manner improve his chances of success for the attainment of a prize so great. Moreover, no architect who enjoys a good practice which he has earned by fidelity and skill, and force of character, — to say nothing of genius, — would be so improvident of his means as to expend two months of laborious study and office-work, which at a low estimate would cost him six hundred dollars, with a dim prospect of obtaining a return of half that amount, or with the still dimmer prospect (perhaps one chance in fifty) of obtaining honorable and profitable employment in the execution of his design. Thus the honest intention of the commission to obtain the very best practicable results, and to justify themselves by presenting to their constituents the most scientific, convenient, and economical building possible under the circumstances, is defeated by the errors of their programme. This, we fear, adds another to the long list of lost opportunities.

IF the commission for the building of this hospital, or the committee having in charge any important and costly public work of the kind, requiring in its execution an exceptional amount of technical knowledge and administrative experience, would limit their competition (if they must have a competition) to a certain number of architects of assured credit in these respects; if they would lay before them a carefully-prepared programme of requirements; if they would pay the competitors invited a fair amount for the thought and labor and time spent in their service; if they would avail themselves of the advice of approved experts in comparing the relative merits and costs of the designs so submitted, and agree to employ at the usual professional rates the author of the selected design, — they would do greater justice to themselves and to the profession, and serve the public needs with far greater intelligence, promptness, and success. Competitions are a necessary evil at best; but so long as architects are subject to them, it is of the highest importance to the profession and to the public that they be conducted on sound business principles, and not after the fashion of a lottery or a game of chance, in which those having a reputation to preserve cannot embark without loss of self-respect.

IT is to be observed that the Pennsylvania Commission, with the intention of making the wisest use of the $600,000 intrusted to them to expend for a hospital for the insane, have set aside one four-hundredth part of that amount to be divided among five architects, for the purchase of the ideas to realize which they are to expend the rest of the money! Surely the genius, invention, skill, patience, thought, experience, which the commissioners should call to their service, and which are necessary to the preparation of a scheme for the most judicious expenditure of so large a sum, are a combination of qualities rare enough to be worth a very much larger proportion of that amount. It is needless to say that the combination cannot be purchased for the amount set aside by the commission. A few thousand dollars more devoted by them to the procuring of designs from those whose services would be of actual value, would not only secure a practical result more scientific and useful, but would in the end save ten times that amount in the wise economy which is a part of science. The commissioners have in their hands the bestowal of a prize which the most learned and skilful architects in the profession would earnestly contend for to the great advantage of the public; but they have so used their great opportunity as to exclude the best service, and to tempt a multitude of inexperienced aspirants to a gratuitous expenditure of time and study.

OUR valued correspondent "Champlin," continuing the subject of house-drainage, draws our attention to a phenomenon which he has observed in the outflow of waste from his own house. He has a close-built brick cesspool eight feet in diameter and eight feet deep, with an overflow thence for liquids into a percolating stone cesspool ten feet by ten feet; both are domed over at the top, closed each with a flat stone, and covered with soil. Unlike his neighbors, whose cesspools are constructed in the same manner and in the same kind of soil, but who are subjected to the necessity of cleaning out both cesspools at frequent intervals, his own have been in use for four years without being opened, and have given him no inconvenience. A few months ago a deep excavation in the street near his percolating or overflow cesspool revealed the fact that the moisture from it was all absorbed by the roots of three large and very flourishing trees, a tulip and two maples, in its immediate neighborhood. "There could be no accumulation of water," he says, "where there were such channels to draw it up." This certainly is an important point to be considered in locating the area of absorption for household waste. We do not remember to have seen elsewhere noticed this very probable sanitary function of trees, and would be pleased to hear of any other experience in any way bearing upon this point. If the theory is correct, it goes far to solve the most serious difficulty in the problem of drainage without common sewers.

WE took occasion on p. 238 of our Summary, to describe the nature of the commissions intrusted to certain distinguished English artists for the decoration of the wall spaces in Mr. Waterhouse's new Manchester Town Hall. We now learn from our English contemporary, the *Architect*, in its issue of the 14th ult., that this very liberal corporation, in completing its great municipal monument, has still further demonstrated its capacity for appreciating the high civilizing function of such structures, by the character of the fabrics used for hangings in the principal saloons of reception and entertainments. These are not mere costly masses of material provided to order by the upholsterer, but works of art from the school of needlework at South Kensington. One of these is described as a composition of blue cloth in its upper portion, "with a deep dado of blue silk velvet embroidered in silk, with appliqués of velvet representing the cotton plant just bursting into bloom." Others are of red cloth, with a dado "embroidered on a black ground with bulrushes and other plants." We dare to say that no taxpayer of the city, who would consent to having these municipal apartments conventionally set forth with the ordinary silk damask of the shops, could consistently object to such works of art on the ground of inordinate expense. Meanwhile Mr. Ruskin, to whom, more than to any one man, the English people are indebted for the existence of a feeling which renders possible such achievements as this noble hall, in the last number of the *Fors Clavigera* encourages his followers in a manner which has become characteristic of

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late, by speaking "of the little lake of Thirlmere, and stream of St. John's Vale, which Manchester, in its zeal for art, is about to drain from their mountain fields into its water-closets (make pictures of these, will you then, my Manchester friends?)"

THE EIGHTH ANNUAL REPORT OF THE STATE BOARD OF HEALTH OF MASSACHUSETTS.

THE appearance of these reports has become a most important event in connection with sanitary matters. It would be hard to say that each number is better than its predecessor; but certainly each number is full of valuable and important information, stated in so clear and telling a way, that many others than physicians and architects and engineers and professional men generally may receive full benefit from its perusal.

The eighth report (1877) does not fall behind the previous ones either in interest or in value.

While a very large part of it is taken up with questions of Registration, of the Growth of Children, and Diseases of the Mind, the sixty pages relating to the Health of Towns, the equal space relating to the sanitary condition of Lynn, and the long account of the condition as to pollution of the Nashua River, are of collateral interest to the architect and engineer. They contain very much that no one who desires to keep himself at all *au courant* with sanitary matters would be willing to skip over.

The special reports by Dr. Charles F. Folsom on the "Disposal of Sewage," and "Drainage and Health," and the carefully-prepared paper of Mr. Cheesbrough on "Sewerage; its Advantages, Disadvantages, Construction, and Maintenance," appeal directly and in a strictly professional way to all who have to deal with the sewerage and house-drainage questions. Mr. Cheesbrough's paper may be considered rather as an argument in favor of the sewerage of all towns, and especially of the employment of skilful professional advisers, than a handbook for the guidance of engineers. He is particularly strong, and we think particularly sound, on the question of changes in the governing body by which sewer-work is to be executed. "The plan, after being carried out, should not be so changed or modified as to impair its efficiency, which might happen if new men are placed in charge of it.... Instances could be mentioned where millions have been squandered and appropriations exhausted, and the people obliged to do without much-needed improvements, for the completion of which they were taxed enough, or were loaded with bonded obligations more than sufficient."

The following quotation will be appreciated by all who have to do with the direction of public or private work: "As in really or supposed dangerous attacks of illness, non-professional people do not begin to consult books or send their neighbors to inquire of people who have had apparently similar diseases, but rather send in haste for an experienced physician whose education and practice would qualify him to say what should be done; so ought cities and towns, through a judiciously-appointed commission, to employ thoroughly trained and experienced sanitary engineers, wherever they may find them, at home or elsewhere, and not attempt to get the necessary knowledge by simply consulting books or sending out committees to visit other places, ... as the committees sometimes return feeling confident that they know how to plan and carry out such work without further professional aid; but communities find out, after a few years, that they have been educating men at a cost vastly greater than that for which thoroughly competent experts could have been employed."

Mr. Cheesbrough thinks that in villages and towns there may be a cheaper means for removing dangerous organic matter than by expensive sewerage, but insists that this removal must be complete and systematic; no accumulations of surface-filth and no leaking cesspools being allowed. So far as house-sewage is concerned, he thinks a capacity for removing "twenty gallons per hour for each inhabitant" would be abundant for large cities, and extravagant for towns.

Dr. Folsom's paper on the disposal of sewage is itself only an epitome of knowledge acquired during the year; and it would be useless to attempt to bring any fair view of it within the scope of a review like this. The teachings are not all in the same direction; and we see here, as elsewhere, that doctors disagree seriously.

At the meeting of Sanitary Engineers under the auspices of the Society of Arts, held in London in May, 1876, a report was made embodying very important results arrived at; among them this:—

"It was conclusively shown that no one system for disposing of sewage could be adopted for universal use; that different localities require different methods to suit their special peculiarities; and also that, as a rule, no benefit can be derived at present from sewage utilization."

The accounts here given of the results of sewage-farming, covering all of the best-managed cases in England, lead to the conclusion that while no money is generally to be made by this use, agricultural irrigation affords, under proper circumstances, the best means for disposing of the waste of towns. The progress of the irrigation experiment at Gennevilliers, below Paris, is very encouraging; and it seems possible that the whole sewage of that city may be judiciously disposed of under the peculiarly favorable circumstances existing. The investigations thus far made seem to prove conclusively that this irrigation has no unhealthful influence on the outflowing water. "On its effluence from the soil it was found to contain from eight to ten per cent of oxygen, which is an unerring indication of healthy water."

The oxidizing action of an aërated soil in purifying filthy water seems to be generally accepted as one of the chief agents by which foul sewage is converted into pure water. The English Rivers' Pollution Commission say, "The prolonged filtration to which such water has been subjected in passing downward through so great a thickness of soil or rock, and the rapid oxidation of the organic matters contained in the water when the latter percolates through a porous and aërated soil, afford a considerable guaranty that all noxious constituents have been removed."

Dr. Frankland, speaking of river water, says, "By gradual oxidation, this animal contamination has been, so far as analysis can show, converted into innocuous inorganic compounds before the water was submitted to investigation."

Dr. Folsom should hardly have published this quotation from Dr. Alfred Carpenter without giving us a little more:—

"The most important operation which takes place on a sewage-farm is the destruction of contagious particles. The moment they are brought into contact with the spongioles on the rootlets of sewage-grown crops, as may be easily seen in any field of rye-grass which is being irrigated by sewage, the spongioles seize upon the albuminous matters in the sewage by a kind of elective affinity, including the contagium particles, remove them from the water, and digest them with an avidity which is most remarkable; no putrefaction takes place, no retrograde decomposition arises, but the albuminous matter is digested as perfectly as white of egg is digested by the human stomach. Putrefaction is no part of sewage utilization; and, if putrefaction takes place, there is a corresponding decrease of productive power, and also a proof that sewage-farming is not properly carried out."

Coming to us in this bald form, it suggests the query, just how we are to go to work to see the sponge-holes seize albuminous matters by a kind of elective affinity; how we are to study their avid digestion; whether it is quite definitely known that the plant absorbs any putrescible matter before its decomposition. From an agriculturist's point of view, Dr. Carpenter seems to have been, "on this occasion only," somewhat enthusiastic.

In Dr. Folsom's reference to the fever in the Uppingham School, and Mr. Rogers Field's report thereon, we have the following, which might apply almost without change to nearly every small town in the country: "The town is at the present time essentially a cesspool town, and nearly every house has its own well, very many of which are situated near cesspools or other sources of contamination." Of the twelve houses constituting the school, he adds, "Twelve drain either wholly or for the most part into cesspools," and, "in ten houses, each has one or more of its wells badly situated from contiguity to cesspools or foul drains."

We have seen no stronger statement of the sanitary influences of air which we breathe, than is contained in the following, from "Yellow Fever and Malarial Fever," by Dr. Greensville Dowell, that "the diseases cannot be taken in pure air from persons, clothing, trunks, or black vomit; but in impure air, other things beings suitable, it can be taken from either."

THE ILLUSTRATIONS.

CATHEDRAL OF ST. LORENZO, GENOA, ITALY.—GRAND STAIRWAY OF THE UNIVERSITY, GENOA, ITALY.

THE Cathedral of St. Lorenzo was built in the eleventh century, and was restored about 1300; but the façade belongs to an even later date. In some part of the church are inscriptions which state that the north side was completed in 1307 and the south side in 1312. These inscriptions are engraved in capital letters, of a form similar to those employed in contemporary manuscripts.

The nave is preceded by a Gothic inner porch with a groined roof, which, together with the pilasters which support it, is formed of alternate courses of black and white marble. The division between the nave and aisles is marked by Corinthian columns which support pointed arches. Each column is made of alternate layers of serpentine stone of the variety known as *Polcevera breccia*, and white marble. Upon these arches rests an entablature which bears a long inscription in Gothic letters; and over this again is a second tier of round arches which are supported by alternate short columns and pilasters, the latter of which are in the early Italian-Gothic style. The choir and side-chapels have been modernized and covered with carving, painting, and gilding.

The richest portion of the cathedral is the chapel of St. John the Baptist, into which no female is allowed to enter except on one day in the year. This practice was instituted by Pope Innocent VIII., to keep fresh the infamy of the daughter of Herodias. The screen which divides the chapel from the rest of the church is rich *cinque-cento* Gothic, and was finished in 1496.

We are encouraged to reproduce the above-mentioned drawings from the rare work of M. G. Bourgerel (*Fragments d'Architecture et de Sculpture*) as examples showing how a really good sketcher seizes upon the characteristics of his subject, and concentrates his attention upon them to the exclusion of details that would be

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irrelevant to the effect that he is aiming to produce. These sketches illustrate so aptly the views which we have already expressed on this subject (see *American Architect and Building News*, Vol. II., p. 10), and the subject itself is of such importance in its application to our own work, that we venture to repeat the points in question:—

"A common notion is that a sketch is an incomplete drawing, or perhaps a rough drawing; but a sketch, in the proper and artistic sense of the word, differs from a drawing in kind rather than in degree. To draw is to represent, as well as drawing-materials will allow, the whole aspect of a thing. In imperfect drawing one goes as far toward this as his means, his time, or his skill permits. To sketch is to select some particulars of one's subject, and reject others, with a view to a preconceived effect. The sketcher chooses some few characteristics or a single characteristic, and sets it forth with as much decision as possible: the draughtsman represents his subject as completely as he may under the circumstances, and stops. The essence of the sketch is in the selection of elements and in the combination of them so as to produce a single impression decided upon beforehand. A sketch is one-sided, a drawing is incomplete. It follows, therefore, that there will be more diversity among sketches than among drawings. . . .

"The more you strip away from your subject, the more important it is to see that the things you keep shall be of value. Next to direct falsity, the worst offence of a sketch is emptiness: whether it appears in the guise of careless dash or of laborious puttering, this is alike offensive. . . .

"When a man has any thing decided to say, and knows his means of expression, he is pretty sure to say it with spirit, if there is any spirit in him. If there is none, he will not succeed in counterfeiting it. . . . Sketching is not a careless or a lazy or an easy occupation. It may be quick and decisive, but it demands extreme care. The lazy man will do better in drawing. The cardinal quality of a sketch is concentration. Hence the whole of it must be foreseen from the beginning. Every unconsidered or unnecessary touch in it is an impertinence. The less there is in it, the greater care is necessary that that little shall be good."

COTTAGE NEAR COLUMBUS, OHIO. MESSRS. KIRBY AND CAMERON, ARCHITECTS.

(121 South High Street, Columbus, O.)

DETAILS FROM THE STORE OF GARDNER BREWER, ESQ., BOSTON, MASS. MESSRS. PEABODY AND STEARNS, ARCHITECTS.

This is another of the drawings prepared under the auspices of the Portfolio Club.

HEATING AND VENTILATING THE HÔTEL DE VILLE, PARIS.

THE scheme for heating and ventilating the Hôtel de Ville at Paris must be examined from the point of view of its supplying the different suites of apartments into which the building is divided. Some of these suites, as for example, that of the Municipal Council, and that for municipal festivals, require only an intermittent supply, while others require a more constant supply.

In order to warm and ventilate the several apartments, it is necessary to unite them in several groups according to their several needs; and for this reason five grand divisions have been adopted, each wholly independent of the others. These are: 1, The suite of the Municipal Council. 2, The suite of the Prefect. 3, The various offices. 4, The bureaus of loans and collections (*emprunts et tirages*). 5, The state apartments.

All the steam that is needed for these five groups is generated in boilers placed in the centre of the sub-basement of the building. These boilers are capable of generating more steam than there is ever any need of using, even if all the rooms have to be heated at the same time; a thing which never takes place. This excess of capacity has been provided, that the periodic cleansing and any necessary occasional repairs may be effected without the inconvenience occasioned by shutting off the heat.

The most important point, the point which forms, as it were, the base of the scheme, is the means that have been provided for introducing fresh air into the building; and we are going to consider each of the groups separately, contenting ourselves with a summary description of the arrangements indicated in the accompanying section of the building.

1. *Service du Conseil Municipal.*[1]—The suite of the Municipal Council comprises a large council chamber, with its dressing-rooms, refreshment-room, committee-rooms, offices, etc. The most important consideration is the heating and ventilation of the council chamber. The purposes for which this is used prevent the adoption of any visible heated surfaces; these surfaces will therefore be placed outside, and will there perform the office of furnaces, discharging heated air into the room by means of openings in the walls, at the level of the floor, and also by openings arranged above (*en contre-haut*) at a height sufficient to prevent persons from feeling too directly the entering air. The openings at the level of the floor are intended to be used for heating the hall before it is occupied; while after the hall is occupied, the supply of heat issuing from these openings can be considerably lessened or even entirely shut off, while the upper openings are brought into use. The aspiration of the vitiated atmosphere takes place through openings in the risers of the steps upon which the seats are placed.

The temperature of the fresh heated air can be regulated at pleasure, but it should not exceed 35° centigrade. The pressure of the air in the hall is to be always a little in excess of that of the outer atmosphere, so that there will be no troublesome draughts drawing in from the outside. The other rooms of this suite will be warmed by unconcealed steam-coils, and ventilated by special ventilators.

Service du Préfet.[1]—The suite of the Prefect comprises on the ground floor, the grand staircase, some minor offices, and the stables; in the entresol, the private offices and apartments; and finally on the first floor, the reception-rooms, the cabinet of the Prefect, and the grand dining-hall. These rooms present such varying conditions, that we will examine the arrangements adopted for each of them; and first, as to the *Salons du Préfet*. These will be carefully ventilated. Assuming that four persons per square mètre is the maximum number to be provided for, arrangements have been made for an hourly admission of thirty cubic mètres of fresh air per person. The entrances for heated air are placed as in the rooms previously described. Although the greater portion of the vitiated air is to be drawn out near the floor, yet it has been thought good to arrange at the top of the room an exit for bad air, which experiments made at the old Hôtel de Ville prove should furnish one-quarter of the total ventilation. Here, too, the air will be under a pressure slightly in excess of that without. The entrances for fresh air are to be placed as far as possible from the ascending currents of air vitiated by the combustion of gas.

The ante-chambers, passages, and staircases will be heated from the floor, and to a higher degree than is the salon. Before the arrival of the guests the heating will be managed as already explained; but as the rooms fill, each individual bringing a new source of heat, the temperature of the fresh hot air introduced will be gradually lowered, until, if it is desired to keep the temperature of the rooms constantly the same, air of a lower temperature than that of the saloon must be introduced. This necessity requires a great nicety in the adjustment of the apparatus, and it is only by steam heating that entirely satisfactory results can be attained. The heating surfaces placed above the ceiling are heated by steam, the supply of which can be regulated at will. The vitiated air finds exit near the floor, and passes out into the inner courts, where an upward draught is created. The same arrangements have been adopted for the great dining-hall.

All places which produce any odor whatever, as water-closets, stables, kitchens, etc., are to be ventilated by aspiration. The water-closets will be vigorously ventilated by aspiration; the air being put in motion during the day by mechanical means, while at night gas-jets will cause sufficient movement to assure a good circulation.

The stables, however, present conditions altogether peculiar. The gases which are produced by the decomposition of manure are heavier than the atmosphere, and ventilation must be effected by aspiration through openings near the floor; and, as has been shown by numerous examples, these openings can without causing ill effects be placed near the floor under the mangers. Such openings must be able to remove 200 cubic mètres hourly. In ordinary weather, fresh air can be introduced at the opposite end of the stable near its top, while when the temperature of the outer atmosphere is so low that it would be dangerous to introduce it directly into the stable, a special apparatus is brought into use, which mixes a portion of the air of the stable itself with the outer air before this is allowed to enter. During the daytime, the movement of air is kept up by mechanical means, while at night the burning of gas supplies all the motion that is needed.

For the various bureaus and offices more simple means have been adopted, for in none of them are enough people gathered together to require the employment of any energetic means of ventilation; since the galleries, passages, and staircases are furnished with a more than sufficient supply of fresh air by the opening and shutting of doors. The steam-coils are provided with valves, by which the supply of heat can be regulated at will.

Service des Emprunts et Tirages.[2]—This suite comprises a large hall on the ground floor, which is connected with the various offices, a hall in the sub-basement, and the *Salle St. Jean*.

In the great hall, eight large steam coils and openings near the floor for the introduction of hot air afford ample means for heating and ventilating. The offices communicating with this hall are heated by the forced introduction of hot air, so that they will always be under a pressure slightly in excess of that in the large hall. The vitiated air will be withdrawn through openings near the floor and through openings in the glazed ceiling, these last being intended particularly for use during the summer. The hall in the sub-basement will be heated at the top of the room, and also by twenty steam coils arranged at the bases of the columns supporting the floor above. The vitiated air will be withdrawn through openings in the exterior, which empty into a common duct (*caniveau*).

The *Salle St. Jean* will be heated and ventilated by fresh air which passes over heated coils in the great hall in the sub-basement, and is introduced through openings at regular intervals on each side of the hall. Evacuation will take place at the two extremities by the staircases which descend to the sub-basement, and which answer the purpose of great evacuating channels.

[1] See the left-hand part of the section, the façade of the building.

[1] The rooms upon the right of the section, which face upon the river.

[2] Facing on the Rue de Rivoli.

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Service des Fêtes. — The heating and ventilating of these rooms, which include all the grand saloons of the first story, are arranged in exactly the same manner as in the suite of the Prefect.

It results from the arrangements that we have just described that it is possible to heat and ventilate a large building, whose needs are so numerous and so various as those of the Hôtel de Ville, by a single group of boilers, and that the management of them is not over-complicated; also that all the practical difficulties attending the heating and putting in motion of so large a body of air are solved by the arrangements indicated above. It should be added, too, that from the point of view of economy, this scheme presents the best conditions, in that as each heating apparatus is controlled by a separate valve, it is reasonable to count upon a total economy of considerable importance in the use of heat.

In conclusion, as it will be interesting to see what will be the expenditure of combustibles for each of these five groups when each is furnished with its maximum supply, the following figures showing how many pounds of soft coal are consumed per hour are appended.

For the Municipal Council,	167
" Prefect,	572
" Offices,	744
" Loans Office,	398
" State Apartments,	858
	2,739

or in all, less than a ton and a half per hour. These figures show better than would a long discussion, the advantages which this scheme presents. — *La Semaine des Constructeurs.*

CURIOSITIES OF TRADES-UNIONISM.

THE difficulties in the labor market have had, amongst other effects, that of bringing forward a number of grumblers at the manner in which the British workman now pursues his calling. Thus a correspondent of the *Liverpool Courier* narrates the following cases which have come within his "own knowledge." "A gentleman in Warwickshire, six miles from a town, required some alterations and repairs to his house. The first day the workmen came out he found them on his lawn, under a tree, smoking, and on inquiring why they did not set to work, was told the 'club' allowed an hour for every three miles from town; the railway brought them in twenty minutes; they therefore had an hour and forty minutes to spare, and would be fined if they started work before the time. Recently I required four or five new bricks in the back of my kitchen grate. Two men came to do the job. I asked what the second man was for, and was told the 'club' required that each brick-setter should be attended by a laborer, 'but this chap can't do nought at this job, but I should be fined if I come without him.' When the town hall in one of the pottery towns was being built, the architect procured certain ornamental bricks from Kent. The club declined to allow the workmen to use them, because they came from a distance beyond the radius prescribed by its rules. The men were ordered to strike, and the building was finished by men imported from France; and for some time military protection had to be given to the strangers. When Watts & Co. of Manchester were roofing their new warehouses, the contractor used horse-power to hoist the slates. When a third of the work was done, the club ordered the slating to be undone, the slates taken down and carried up ladders by men. The contractor refused; the men were ordered to strike, and the contractor and his partner finished the job with their own hands, and became liable to heavy forfeit for non-performance of contract to time. Recently two new shops were erected in Manchester fronted with Bath stone. Every stone arrived ready for fixing, but the club declined to allow the stone to be used unless the dumb show of 'tooling' was gone through on the ground, and the men paid the same as though they had actually tooled it. This was refused; the men were ordered to strike, and the work was finished by Belgians. I could fill a book with similar instances of union tyranny. Workmen have repeatedly told me that they won't bring their sons up to their trade, as no union man has any chance of rising above one miserable dead level; and that as regards pay, the scamp and 'duffer' is as well off as the skilled man and the sober man, and that inevitably the quality of British work must deteriorate. Indeed, that it has deteriorated during the last thirty years is evident to any one old enough to remember the work done thirty years ago, or intelligent enough to observe the difference between modern work and the work of our fathers' time."

Another gentleman, writing to the *Manchester Examiner and Times*, says, "A short time ago a friend of mine had a bit of joiner's work that required doing, for which eighteen pence would have been an ample payment. One day a joiner came to the job, but speedily adjourned to an adjacent beer-house, and his visits to that place of refreshment were repeated at short intervals during the day. My friend thought this style of thing looked more like play than work, but he was undeceived when he received a bill of 7*s.* 6*d.* for ten hours' 'work,' at 9*d.* per hour. This case clearly shows who will have to pay the additional sum per hour should the joiners succeed in the strike in which they are now engaged; and it will not be denied that in most trades increased wages mean greater intemperance, with less work, and that of an inferior quality." — *British Architect.*

PORTLAND CEMENT.

WE quote the concluding passages from Mr. Deacon's paper on cement, which we mentioned in a late issue: —

"*Portland Cement Setting.* — One of the qualities of both natural and artificial cements, as distinguished from limes, is their property of quick-setting. This peculiarity is valuable in some plasterer's work, and in pointing joints in running water, where the mortar would otherwise be washed out; but there are probably few other circumstances in which any advantage is derived from the use of very quick-setting cement. On the contrary, it is exceedingly difficult to insure its immediate application after gauging, and any remixing greatly weakens, if it does not altogether destroy, the cohesion.

"The best Portland cement has most fortunately the property of setting much more slowly than any other, and it may therefore be used with far greater safety in situations where its application cannot be closely watched.

"In certain classes of work it is extremely difficult to place mortar or concrete *in situ* immediately it is mixed. Take, for example, the case of a carriage-way foundation 25 feet wide. The excavated materials must be removed from, and the concrete materials brought to, the face of the work by the same route; and if the concrete is to be immediately laid, the mixing apparatus, and the men employed in the work, must be accommodated on the narrow excavated ground, and must be moved back as the work proceeds.

"The great advantage which would arise if the concrete or mortar could be brought to the ground ready mixed must be apparent to all. To ascertain if this was possible without deteriorating the quality of the work, the author, in 1872, prepared twenty-four blocks of concrete of one cubic foot each, and allowed different periods to elapse between gauging the material and moulding it. These blocks were tested by crushing at the material-testing machine in Birkenhead, belonging to the Mersey Docks and Harbor Board, with the following results: —

RESULTS OF TESTS AS TO THE RESISTANCE TO CRUSHING OF PORTLAND CEMENT CONCRETE BLOCKS, EACH BLOCK 1 FT. CUBE. PROPORTION OF GRAVEL TO CEMENT, 5 TO 1.

Intervals in minutes between gauging concrete and filling moulds.

	0	20	30	40	45	50	60	75	90
Resistance to crushing in tons after 28 days..	48.1	50.0	50.0	50.0		47.15	42.15		
Resistance to crushing in tons after 26 days..	43.0	48.0	50.0	47.17		47.0	48.15		
Average.....	45.55	49.0	50.0	48.58		47.07	45.15		
24 days.....	49.15		50.0		50.0		49.12	43.1	37.1
21 days.....	50.0		50.0		50.0		46.0	5.00	50.0
Average.....	49.57		50.0		50.0		47.56	46.55	43.55

"It is unfortunate that the power of the machine was limited to fifty tons, and that out of twenty-four blocks, eleven were therefore not broken. But the result proved beyond doubt that on the average these blocks, the concrete of which had stood from twenty to thirty minutes before being placed in the moulds, were actually stronger than those in which the concrete was immediately moulded.

"The author is only able to explain this on the assumption that even in this good and well-purged cement there was some free lime which began to slack on the application of water, thus producing numerous but invisible points of weakness in the blocks first moulded; while in those made with concrete, allowed to stand after gauging, the materials were not moulded until the slacking process was completed.

"Since the date of those tests about 100,000 yards of concrete have been laid, after being mixed in and carted from the nearest available yard. The rate of progress of the work had been greatly increased, and the results have been in all respects satisfactory.

"It is necessary to remark here that although this is a valuable quality of good Portland cement, it would be most dangerous to take advantage of it without making quite certain that the cement is good and not quick-setting.

"*Use of Portland Cement in Iron-work.* — Until Portland cement of good quality was applied for the purpose of making joints between iron and stone-work, there was no entirely satisfactory material for the purpose. The author has used it under a great variety of conditions; and when other conditions failed to keep the tar of a roadway from passing between buckled plates and the arched ribs of a wrought-iron bridge, calking with Portland cement was perfectly successful. In preserving the bottoms of iron ships it has been long used with the greatest advantage, and in conjunction with iron girder work it is more easily and safely employed than any other material.

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"*Conclusion.* — In this paper the author's object has been to bring before the society certain facts concerning Portland cement, which have presented themselves in the course of his experience. Those who desire to obtain a complete knowledge of the subject as previously published cannot do better than read the two papers by Mr. Grant.

"In conclusion, the author expresses a hope that the simple mode of testing by transverse strength will be adopted by those engineers and architects who require the use of Portland cement only occasionally and in small quantities. Those who do adopt it will find a material at command absolutely certain in its action, by which far the strongest, and, strength for strength, the cheapest, concrete can be made, and which, when used for jointing brickwork or masonry, will in a few weeks give a strength greater than has been attained, even after indurating for 2,000 years, by the imperishable mortars of ancient Rome."

THE WASHINGTON MONUMENT.

28th JULY, 1877.

EDITOR OF AMERICAN ARCHITECT AND BUILDING NEWS.

Sir, — In your issue of 21st inst., treating of designs for completing the Washington Monument, you have fallen into some errors.

The design submitted by Gen. Meigs was not by him compared to the tower of Vienna, the spire of St. Stephen's — but to that of Venice, which is not in style or details incongruous with the Washington Monument, so far as yet built.

The public press seems to have fallen foul of both Mr. Mead and Gen. Meigs, for daring, now that the monument has been brought to a stop, to suggest ideas for its possible and practicable completion. The press objects to one as a sculptor, and to the other as an engineer, for venturing to speak on the subject of a monument, and seems to hold that none but architects and editors and press correspondents may without presumption treat the question involved in its completion. And why? If a sculptor, the author of the greatest purely monumental structure in our country, — that of Lincoln, — may not speak of a monument, pray who may?

The work, as it does not and will not stand, is the design of an architect. It has stood still for years, because no one among the crowds who have subscribed their dollars has approved that architect's design. You do not approve it. No one except the original architect, and the committee which has had the work in charge, ever approved or liked the design. Finally when Congress, appealed to in the centennial year of the country to make an appropriation of public money for its completion, responded to the appeal, but imposed the condition that competent engineers should examine the foundations and report that the money would not be thrown away upon a structure which would not stand, they reported that its foundations were already loaded beyond the limits of safety. This was announced to the public; and no architect came forward to suggest any method by which the precious design of the original architect could be completed or modified, and made possible and stable. In this difficulty, a sculptor whose works give him the right to have an opinion on the subject of monuments, and an engineer who has been more or less engaged in building, and who has studied architecture somewhat and inspected many monuments at home and abroad, offered their mites, their suggestions towards the solution of the question; whereupon the editors and the correspondents fall foul of both.

What right, say they, has a sculptor to suggest a modification of the wonderful design of Mills, the deceased architect, and to suggest that a colossal statue like those of Nero, of Commodus, of Carlo Borromeo in Italy, like the Apollos of the Capitol and of Rhodes, like the Bavaria of Munich, and the Hermann of Germany, would be a fit termination for the tower of Washington? Yet the world looks at such of these colossi as are still standing with interest, sometimes with admiration; and it gapes over the foot of Nero and the arm of Commodus in the museum of the Roman Capitol.

And what right had an engineer to suggest that the square, solid marble tower might be finished in the spirit of some of the many beautiful towers of Northern Italy, and to indicate as perhaps the most suitable that of the Venetian Piazza, about which American travellers rave, and of which they bring back engravings and photographs; which Turner painted, and on which every artist tries his brush?

Verily, it was presumptuous; but it may, after all, do good. It may excite some competent architect to take up architect Mills's unfinished work, which won't stand, to reduce its useless load as suggested by the presumptuous engineer, and make a design either for a lighter factory-chimney or for something better, — tower, campanile, spire, or what not. Nothing can be balder, uglier, or more unmeaning than the original Mills design, which seems to call for half a dozen mills at its base, to give it some inkling of meaning and of purpose, and which, as designed by the architect, won't stand on the architect's foundations.

Begging pardon for having presumed to offer a suggestion on this subject, — sacred monopoly of architects, and tabooed to all the rest of mankind except editors and correspondents, — I remain your obedient servant,

M. C. MEIGS.

[The description of the project of Gen. Meigs for the completion of the Washington Monument, which we printed in our issue of July 21 (p. 229), was, we are sorry to say, subject to the errors common to correspondence from the capital. We now learn from one who writes with apparently better authority, that Gen. Meigs's proposition is to erect upon the unfinished marble obelisk 174 feet high, an open loggia of the same material 50 feet high, crowned with a light spire of copper, the whole being somewhat in the manner of the Campanile of San Marco at Venice, but exceeding it in height by 120 feet. The scheme also involves the removal of 12,000,000 pounds of rough backing in the present structure in order to lessen its weight; and as the new superstructure would not weigh more than 4,000,000 pounds, it is considered that the whole mass would not unduly load the present overtaxed foundations. We owe it to Gen. Meigs to make this correction; but it remains none the less true that a monument of this importance should not be erected, — or as in the present case, completed, — without the aid of the very best artistic ability, architectural, and other, which the country affords. The only way in which the Monument Association can properly meet this very great responsibility is, as we have already suggested, to ask for a national competition of designs, the programme for such competition to be prepared with the assistance of the Trustees of the American Institute of Architects, who should also advise regarding the relative merits of the designs submitted.

This paragraph was already in type when we received the above communication from Gen. Meigs, whose proposition, as now correctly understood, is of a character to deserve consideration, and perhaps sets forth one of the means by which our national reputation, now imperilled by this terrible stump, may be preserved and strengthened. Our attention was originally attracted by the paragraph which so traduced Gen. Meigs's scheme; and, if he will allow us to say so, it seemed to justify our natural distrust for amateur designs. Our call was addressed to architects, because the problem presented seemed peculiarly architectural. Our object, however, will be really attained, if the Monument Association will take pains to obtain and execute the best available design, whether from the hands of an engineer, a sculptor, an architect, or of all three combined. — ED. AMERICAN ARCHITECT.]

BLACK MORTAR.

BRIDGEPORT, CONN.

EDITOR OF AMERICAN ARCHITECT.

Dear Sir, — Can you by letter, or through the columns of your paper, inform me what are the best ingredients for making black mortar? Lampblack is, I believe, commonly used, but I have found that, when used alone, it is inclined to "wash out," and has not sufficient "grit" to make it desirable. It has been suggested that the use of fine coal-dust or foundry-sand mixed with the lampblack would make a mortar that will hold its color, and stand the weather. Will those that have had experience in using black mortar please enlighten me?

Very truly, B.

SAND FOUNDATIONS.

IN a communication lately made to the *Société des Ingénieurs Civils*, M. Lavezzari gave an account of the different devices to which he had been driven during the building of the hospital at Berck-sur-Mer. In this communication there are three points worthy of note. The first is the usage of sand for foundations on untrustworthy soil; the second is the precautions which were taken against the penetration of the walls by moisture, a result much to be feared because of the situation in which the hospital was built; the third is the manner of making a great paving of Portland cement.

The hospital at Berck, built upon sandy downs of a very diversified surface, covers a surface of more than ten thousand square mètres (about two and one-half acres), and hardly one-tenth of it is built over cellars. In order to lay the foundation, it was necessary to proceed as follows: a general levelling of the site took place; the surface was filled in where it was necessary, and cut away at other points. Trenches were then cut, into which was to be poured beton to the thickness of seventy centimètres (twenty-seven inches). The walls were to be seventeen mètres (fifty-five feet) high; and the question to be decided was, whether they could hope to have good foundation on the sandy soil, a great part of which had been filled in, and what precautions must be taken to effect this. The solution adopted by the architect was effectual; for during the ten years that have passed since the building was finished, not the slightest settlement has taken place.

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The sand in its undisturbed beds offered sufficient resistance; for, as we have often pointed out, sand is perfectly incompressible; and it is well known that this property of sand is of every-day use in striking the centrings of vaults and arches. In this direction then, there was no trouble to be apprehended. The difficulty was to obtain a good footing upon the made land. Experiments were made: boxes one mètre high were filled with loose sand, which was carefully rammed, causing the level of the surface to sink seven or eight centimètres (three inches); but when water was poured in, a new settling of five centimètres (two inches) took place; after which the sand in the box had manifestly the same compactness as the sand in its natural beds. Consequently the five hectares (twelve acres) of land were levelled, the trenches for the foundation walls were dug, and were then filled with water until the sand would absorb no more; then the beton was put in. This beton was made with sand taken from the downs themselves, where it had freshened by long exposure to the weather, mixed with hydraulic cement and flint-stones found in the chalk deposits near by, and also with pounded shards from the neighboring potteries; and this simple and economical solution has proved itself entirely satisfactory.

M. Lavezzari also cites an instance where sand was used for a similar purpose. While building a viaduct at Rouen, a soil was encountered so untrustworthy that it would have been necessary to use piles at a heavy cost had it not been possible to employ sand as indicated above. In this case sand to the depth of a mètre was spread upon the bottom of the excavation, where it was forthwith abundantly saturated with the water which the excavations themselves contained. When the sand was perfectly saturated, the beton was poured in; and upon this the viaduct was built, which has never shown any sign of failure. It should however be said that at Rouen the area of the surface of the masonry foundation was more than double that usually allowed for such piers.

It is of course necessary to make sure that no spring or subterranean water-course can wash away the sand thus used for foundations; but the slow infiltration of water is far from harmful, as it allows the sand to pack down more solidly.

Another instance of the value of sand for foundations was also cited in the case of a lofty chimney built over the galleries of a deserted sandstone quarry. A pit was dug at the chosen site down to the floor of the lowest of the deserted galleries, and then filled with sand to a depth of eight mètres (thirty-one feet). Upon this the chimney was built. This case suggests the question whether it would not have been possible to employ a process of this nature for the foundations of the palace upon the Trocadéro, rather than to have squandered the millions which have been buried in filling in the abandoned quarry galleries that underlie the pavilions of the new palace.

The construction of the hospital at Berck presented a second problem for solution. The bricks used, to the number of 16,000,000 — for very little stone has been used on this building — are very porous and constantly impregnated with moisture, for besides the rain which is violently dashed against the walls by the gales of a stormy coast, they are saturated with salts which retain moisture. It was very necessary to guard against defects which would be so prejudicial to a hospital.

The walls were built double; the outer one only half a brick thick, and separated from the inner one by an air space of five centimètres (two inches), and connected to it by occasional headers, the area of whose sections is equal to about one-tenth of the area of the surface of the wall In spite of this outer shell, and in spite of the air space, the moisture penetrated to the inner face of the interior wall by means of the headers. Therefore the architect had recourse to two other devices which have given satisfactory results. The inner wall was stripped of its plastering, and the joints of the brickwork were raked out; then it was covered with common roofing slates which were laid from the top down, so that the lap was made upwards instead of downwards as upon roofs. Upon this surface the plastering was laid, the laps of the slates furnishing sufficient key. This gives very satisfactory results so long as the slates are unbroken by having nails driven through them. The second method was to apply to the inner surface of the brickwork two coats of coal-tar, and then to plaster upon this. It is indispensable that the first coat should be applied in a very liquid state, which is effected by adding to it essence of turpentine or benzine. The second coat may be applied as thick as is desired. There is no danger that the coal-tar will discolor the plastering when this has a lime base.

Finally in the matter of flagging, which was all made of Portland cement, some useful information was imparted. The flagging at Berck was laid without using any foundation of beton below it, but was simply laid upon a bed of wetted sand. The general character of this flagging is excellent, though in some parts shrinkage has taken place and some cracks widely separated are apparent. While on the subject it is worth while to once more recommend that when Portland cement is used it should be well sprinkled one or two hours after setting and also during the first few days after it is laid. It is worthy of mention that cracks produced by the shrinkage of Portland cement decrease in size and number as the proportion of sand to cement is increased: when the mixture has one part of cement to three parts of sand, the cracks entirely disappear. This was the proportion used at Berck, but unfortunately there was a lack of good gravel, and it was therefore necessary to increase the proportion of sand. These cracks can also be prevented by adding one tenth part of fat lime. The justice of these different assertions which are confirmed by experience can be easily verified when one considers the operations that take place in the cement at the moment of setting. When the mixture is made with coarse-grained sand, the cement which is lodged in the interstices of the sand is divided into little masses which are in a manner independent and isolated from one another by the sand, and it is upon these isolated and independent masses that the shrinkage operates. On the other hand, when fine-grained sand is used, the whole mass becomes homogeneous, which when shrinkage takes place is often rent into slabs by the long and deep fissures that are produced by it. — *La Semaine des Constructeurs.*

NOTES AND CLIPPINGS.

THE BALTIMORE CITY HALL. — One of the old landmarks of Baltimore, the City Hall, on Holliday Street, is soon to be torn down. It was built by Rembrandt Peale in 1813 as a museum, and was a popular place of resort for nearly seventeen years, when it was purchased by the Common Council. It was the first building in the city that was lighted with gas — Mr. Peale charging a small fee in 1816 for the exhibition of carburetted hydrogen gas.

THE CLEVELAND VIADUCT. — With the exception of an iron swing bridge of 332 feet span, which gives two openings of 150 feet each, the viaduct at Cleveland, O., will be built of masonry. It will connect two portions of the city which are now separated by a ravine. It is composed of ten nearly circular arches, eight of which have spans of 83 feet, and are 33½ feet in height, while the other two have spans of 97½ feet, and have the same rise. The pier for the swing bridge is 40 feet in diameter at the bottom, diminishing to 33 feet at the top: it rests upon 309 piles 45 feet long. The road-bed is at a height of between 50 and 60 feet.

PRACTICAL DESIGN AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY. — The trustees of the Lowell Institute have made an arrangement with the Massachusetts Institute of Technology for a free course of instruction in "practical design for manufactures," open to pupils of both sexes. Designing is to be studied as an art which can be applied to decoration, or for patterns for fabrics. During the next year the managers of this institute will have looms of all kinds running. Among them will be a pattern loom. The instruction in this department will accordingly be so extended as to make the designer familiar with the weaving of the fabric according to the pattern, and will include the intricate and elaborate operation of putting the patterns in the form for weaving, which, to the uninitiated observer, looks like a tangled wilderness of twine. It is also proposed to unite with the study of chemistry the art of making colors.

ARTESIAN WELL. — An artesian well, which has reached to a depth of 1,377 feet, is being bored at Charleston, S.C. 1,370 feet of piping have been inserted, and as fast as the depth is increased more piping will be used, until a stratum is reached sufficiently hard to render this unnecessary. One small head of water has been reached, but it was so small that it has been shut off.

CLAY RAILROAD TIES. — An Iowa man has invented and patented a railroad tie made of potter's clay. It is in sections of about a foot long, which are bolted together. The pieces are about eight inches thick, and are burned as hard as a flint.

AN OLD MARBLEHEAD CHURCH. — St. Michael's Church at Marblehead, Mass., which is said to be the oldest edifice of the Episcopal Church in New England, was erected in 1705, the frame and all the material used in its construction being brought from England. The building retains many of its original features: the ancient reredos, with its credo and decalogue; the ancient chandelier, "the gift of John Elbridge, Esq., of ye city of Bristol, 1732," which, on special occasions, is used to illuminate the church; the original lock and key with which the doors were fastened by the church fathers; and the same old pulpit, of a wine-glass pattern. It is a boast of the old parish that its second rector, Rev. David Mosson, performed the marriage ceremony for George Washington and Mrs. Custis.

TOWN HEATING BY STEAM. — Mr. Holly's method of heating towns by steam is shortly to have a practical trial at Lockport, N.Y., as the pipes are nearly all laid, and every thing is ready for the trial.

BURSTING OF A DAM. — Early on the morning of July 30, Strathaven Dam on Big Crum Creek at Swarthmore, Penn., gave way, causing great damage to property below. Ten houses in Avondale were washed out, and several persons carried down the stream, but were all saved. Great damage was done to farmhouses along the creek. Three bridges, a wool-house, wagons, fences, trees, and almost every thing near the banks of the creek were swept away.

CREAM-COLORED BRICKS. — Mr. T. M. Clark of Ottawa, Canada, has found that common red brick clay, when mixed with a certain portion of fresh water shell-marl, produces a beautiful white or cream-colored brick. Bricks made in this way have been used to a considerable extent in Ottawa city. This discovery is of importance, as shell-marl exists in a great many places in Ontario and Quebec, and white bricks may now be made at these localities instead of the less valuable red ones.

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GOOD WORKMANSHIP. — It is said that the Masonic Temple at New Haven, which has been built but five years, has been declared unsafe, the walls being far from perpendicular.

THE ROOSEVELT MONUMENT. — The Roosevelt Hospital, New York, consists of a number of buildings included in the block bounded by Ninth and Tenth Avenues, and Fifty-eighth and Fifty-ninth Streets. The buildings, grounds, and a large amount of money were gifts from James Henry Roosevelt. The managers of the institution have determined to raise a monument to Mr. Roosevelt. It will be pyramidal in shape, and will be composed of two large pieces of granite, each over six feet in height. A raised shield and flowers ornament the upper portion. Under them is a piece of scroll-work on which are cut the words, "*Qui Plantavit Curabit.*" A portion of the upper stone is polished, and has the following inscription in raised letters: "James Henry Roosevelt, the generous founder of this Hospital, born in the city of New York, Nov. 10, 1800, died Nov. 30, 1863. A man upright in his aims, simple in his habits, sublime in his benefaction." The pedestal is finished, but the inscription is not yet cut.

GOLD FROM THE ROOF OF THE MINT. — The Philadelphia *Bulletin* says: "The dust which has been allowed to accumulate upon the roof of the Philadelphia Mint during the past twenty-five years was collected recently, by order of Gov. Pollock, for the purpose of ascertaining what proportion of metal it contained. The roof is of asphalt, and, as it softens, the dust sticks to it tenaciously. Some amount of difficulty was consequently experienced in removing it, but finally a quantity amounting to 1,732 pounds in weight was removed. This has just been submitted to the usual assaying process, and the result shows that 42 ounces of standard gold and 96½ ounces of standard silver — a total valuation of about $850 — had been conveyed in the upward flight of the smoke of the chimney to the place where it became located for a season. A similar experiment was tried a quarter of a century ago, and out of 3.80 ounces of dust an ounce of gold was extracted, which is now exhibited as a curiosity in the office of the assayer. The floors of the Mint are swept every week and the accumulation preserved, and once a year the woodwork of the refining-room and the gloves of the employees are burned and the precious dust obtained from them, while the residue is sold to sweep-smelters.

ICE MACHINE. — An ice machine at Dallas, Tex., just built, can make a cake of ice 30 feet long and six feet wide, and weighing 10,000 or 12,000 pounds. It is formed by freezing fine spray as it falls upon a board. Four cakes of ice can be made each day. The works cost $30,000.

A SIGN OF THE TIMES. — Only twelve of the fifty-five lime-kilns at Rockland, Me., are in operation, owing to lack of business.

CLEOPATRA'S NEEDLE. — The obelisk, and the vessel for its conveyance to London, will be launched about the 10th of August, if the weather is favorable.

STREET DUST. — Signor Parnetti has, during the last four years, analyzed the dust and *débris* of the streets of Florence and Paris. His investigation of the *débris* of the horse-paths proves that the dust contains 35 per cent of iron given off by the shoes of the horses. In the dust from the sidewalks he finds from 30 to 40 per cent of good glue. Signor Parnetti selected and treated separately the dust from the causeways of the Boulevard des Italiens during a period of two months, which uniformly gave 30 per cent of good transparent glue, it is said quite equal to Belfast glue. He proposes to place his discoveries at the service of a limited company, with a view of establishing blast furnaces on the banks of the Thames, to recover the iron thus lost, and a large glue works, which, it is thought, will produce more glue from the wasted material than will supply all London for every purpose.

EXHIBITION OF PREMIATED ARTICLES. — It is suggested by Sir Julius Vogel in the *London Times*, that at the close of the forthcoming Paris International Exhibition there should be a supplementary exhibition of all the articles which are praised by the jury. He thinks it would be a great incentive to exhibitors of a really good class, as to occupy a place in the prize exhibition would mean the certainty of their goods being examined and appreciated by many thousands of intelligent people.

VENUS OF MILO. — The truth of the finding of the arms of the Venus of Milo is denied on all hands.

A PREHISTORIC CITY. — A late number of the *Academy* gives a description of the ruins of a prehistoric city in Tuscany that has recently been discovered. It lies in the district of the *Maremma*, out of the line of travel, on the upper part of Monte Leone. The walls, which are of boulders about three feet in length, fitted together with rude rubble, and about twenty feet in thickness, cover a circuit of fifteen miles. They are about seven feet high, but were evidently much higher originally. They are broken at intervals, but no gates are to be seen. They were no doubt built for defensive purposes, and were either the acropolis of a city or the fortified enclosure of one. It must have been as large as imperial Rome itself. Owing to the density of the forest, the remains are difficult of exploration. If they are not Etruscan, they must belong to a very remote antiquity.

LA SEMAINE DES CONSTRUCTEURS. — *La Semaine des Constructeurs* signalizes the beginning of its second year by an increase of the number of its pages.

VIADUCT. — The Göltzschthal Viaduct in Saxony is four stories high.

A DUTCH COMPETITION. — The Dutch government is about to open a competition for a new University Building at Leyden. The appropriation for the building is about $450,000. The successful competitor is to carry out his design or receive in lieu of this a premium of 5,000 florins ($2,200). Designs must be sent in on or before Oct. 1, 1877.

ROMAN BRIDGES. — The stone bridge over the Adda at Prezzo was the longest stone bridge that the Romans are known to have built: it had a span of 246 feet. The next longest was the one over the river Dee, which had a span of 200 feet.

TRAJAN'S BRIDGE AND WALL. — Trajan's Bridge over the river Danube was not a mere floating bridge, but a permanent structure, carried on piers 150 feet high and 60 feet wide, and it comprised 20 arches, extending altogether over a span of 4,770 Roman feet. This giant structure seems to have been intended as a fortress as well as a bridge. Standing as it did 80 feet above the water, a garrison posted on it would be able to damage or destroy vessels passing under it, while they would be above the reach of retaliation. It was destroyed by Hadrian, and its precise locality has been the subject of some dispute. Ruins which evidently might have formed the buttresses of a bridge, occurring on the line of an old Roman road, however, seem to leave little room for doubt. Trajan's wall is another relic of this terribly energetic old Roman. It is, strictly speaking, a rampart of earth about 35 or 40 miles long, and extends from Rassova, just at the bend in the Danube, to the shores of the Black Sea. Though only an earthwork, it is a formidable line of defence. It is eight or ten feet high, with a fosse in front of it, while the western portion is still further fortified by deep lakes and the swampy valley of Kara-Su. In addition to all this, another rampart of a similar character lies just in the rear of it. This is known as the south wall, the space between the two ramparts being from 1,000 to 2,000 feet.

THE TOMB OF KING DAVID. — The tomb of David, just south of the walls of Jerusalem, has been explored. It is now a Mohammedan mosque.

COLORING ZINC ROOFS. — Among recent German inventions is a simple process, depending on the use of acetate of lead, by which every kind of color is applicable to sheets of zinc. By mixing black lead, for instance, with the salt, a very agreeable light brown hue is obtained. It is by this process that the cupola of the synagogue at Nuremberg has been painted. A sufficient length of time has already elapsed, it is said, to show that the atmosphere has had no influence on the zinc sheeting of the roof, thus showing the practical value of the process in such cases. By the addition of other coloring matters, light or dark shades of yellow or gray may be produced.

MODERN RESTORATION. — At a late meeting of the Royal Institute of British Architects, Sir Gilbert Scott in replying to a paper on Architectural Restorations read by Mr. Stevenson at the previous meeting gave several instances of the absurdities that would result, should Mr. Stevenson's conservative doctrine be followed out. Among other examples Sir Gilbert referred to Llandaff Cathedral, which had been allowed from the Reformation downwards to fall into a semi-ruinous state. In the middle of the last century they set to work to redeem it. Their system was as follows: They sent for Mr. Wood of Bath, who had just erected the Pump-Room there. He seemed to have advised that so much of the eastern part as they thought needful should be cut out from the rest and internally converted so far as might be into a double of his Pump-Room. He found the arcades, projecting strings, labels, etc., a bore: so he walled up the arches, chopped off projecting mouldings, and as the old walls might prove to be damp, he battened them over, cutting the grounds to which his battens were nailed deep into the walls. By this clever device, he was able to shut out from view all that was Gothic; and an enthusiastic clergyman writes at the time, "The church in the inside as far as it is ceiled and plastered looks exceedingly fine, and when finished it will in the judgment of most people who have seen it be a very neat and elegant church." The rest he happily left a ruin of which the architecture was as fine as any thing in the country.

THE STATUS OF WORKING-MEN IN ENGLAND. — An architect and business man of Birmingham, England, writes: "What with trades-unions, strikes, etc., we have great difficulty in this country. Of course many, very many, of our working-men are sober, decent members of society, with comfortable homes and money in the bank; but I am ashamed to say that so many of the class are very improvident, low in moral tone, and their sole object seems to be to get through their work and receive their wages at the end of the week, without taking any interest in the work they are doing. Then, they do not turn out so much work as they used to do, taking into account shorter working hours. Some years ago, a bricklayer would lay 1,000 bricks in a day, and lay them well too; now I doubt if any lay 500. Again, the trades-unions, as at present constituted, are, to my mind, a very bad thing. They lay down the law so strictly that the men are slaves to themselves and their unions. We need to sing 'Britons never shall be slaves,' but I fear that many of us are slaves now under a self-instituted bondage. Why should not a man do extra work, and so get more money, if he can and is able? This he cannot do in many cases now, as the unionists say it would cause less men to be employed. Now many good workmen are unable to get higher wages than others who just manage to keep up to a certain standard, and that generally not a high one. You see I take rather a low view of the present state of our working-men, and I am afraid that an immense amount of education will be needed to mend matters."

TALL STUDENTS. — A Wisconsin paper recently stated that a certain Board of Education had resolved "to erect a building large enough to accommodate 500 students three stories high."

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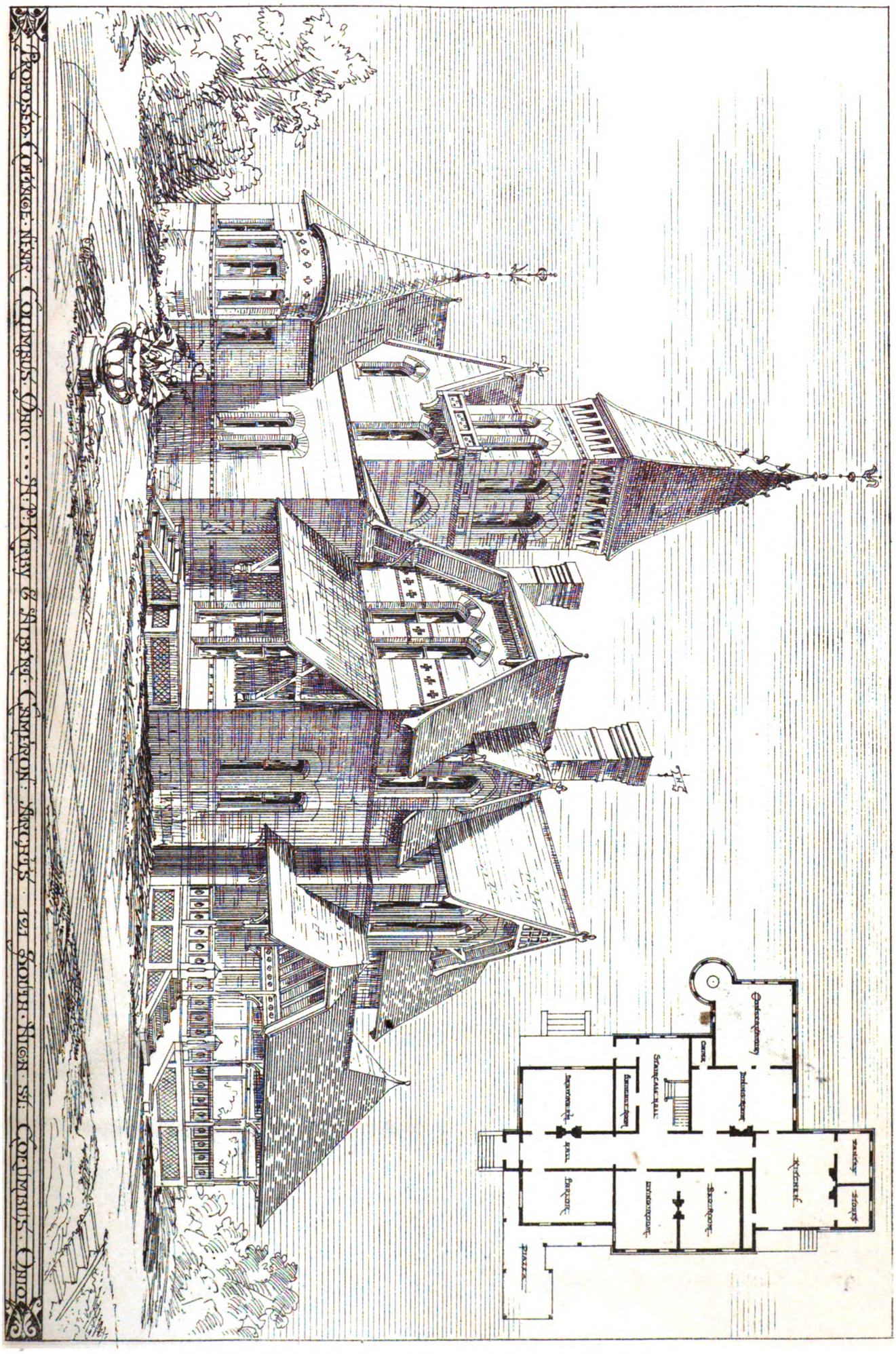

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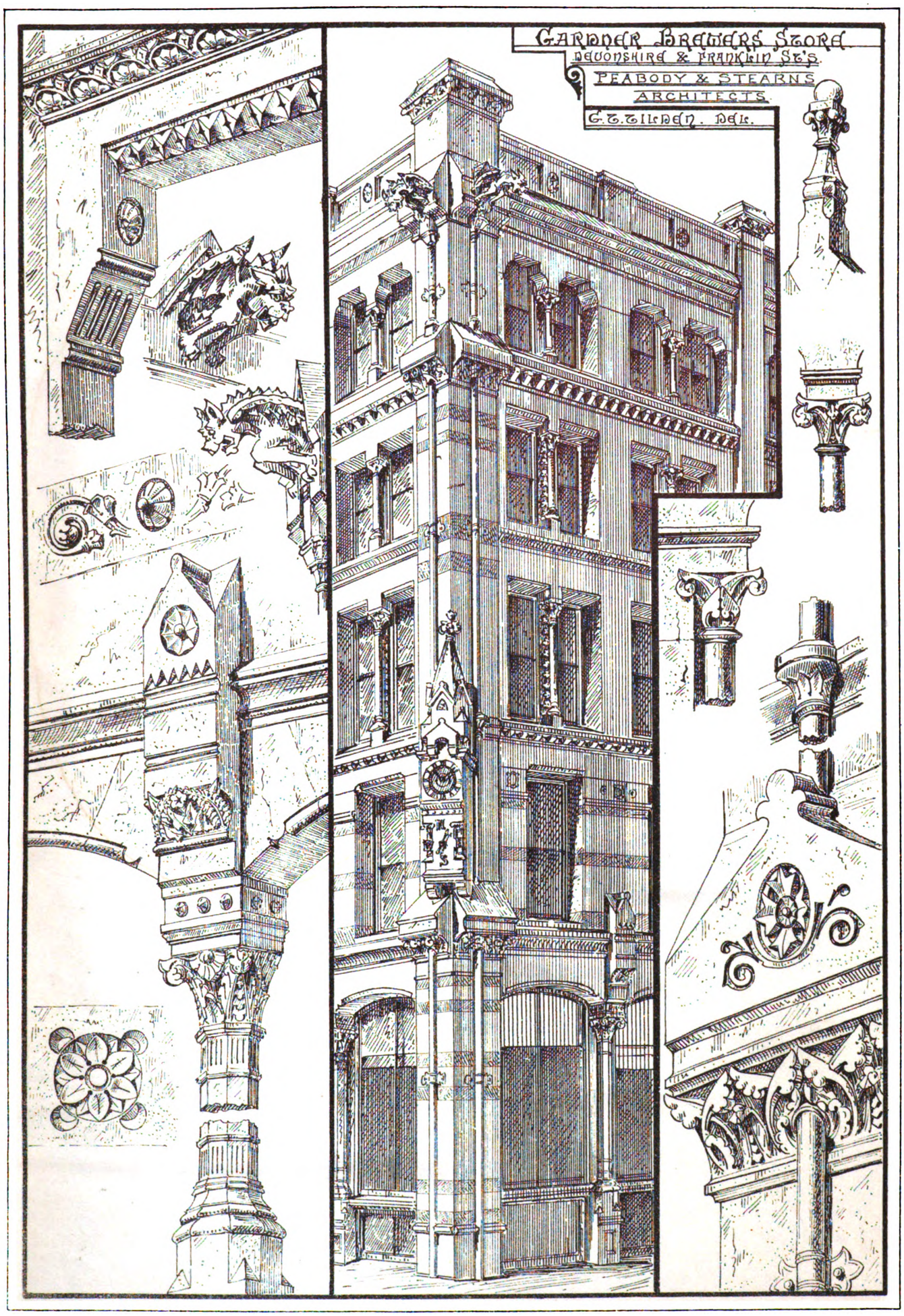

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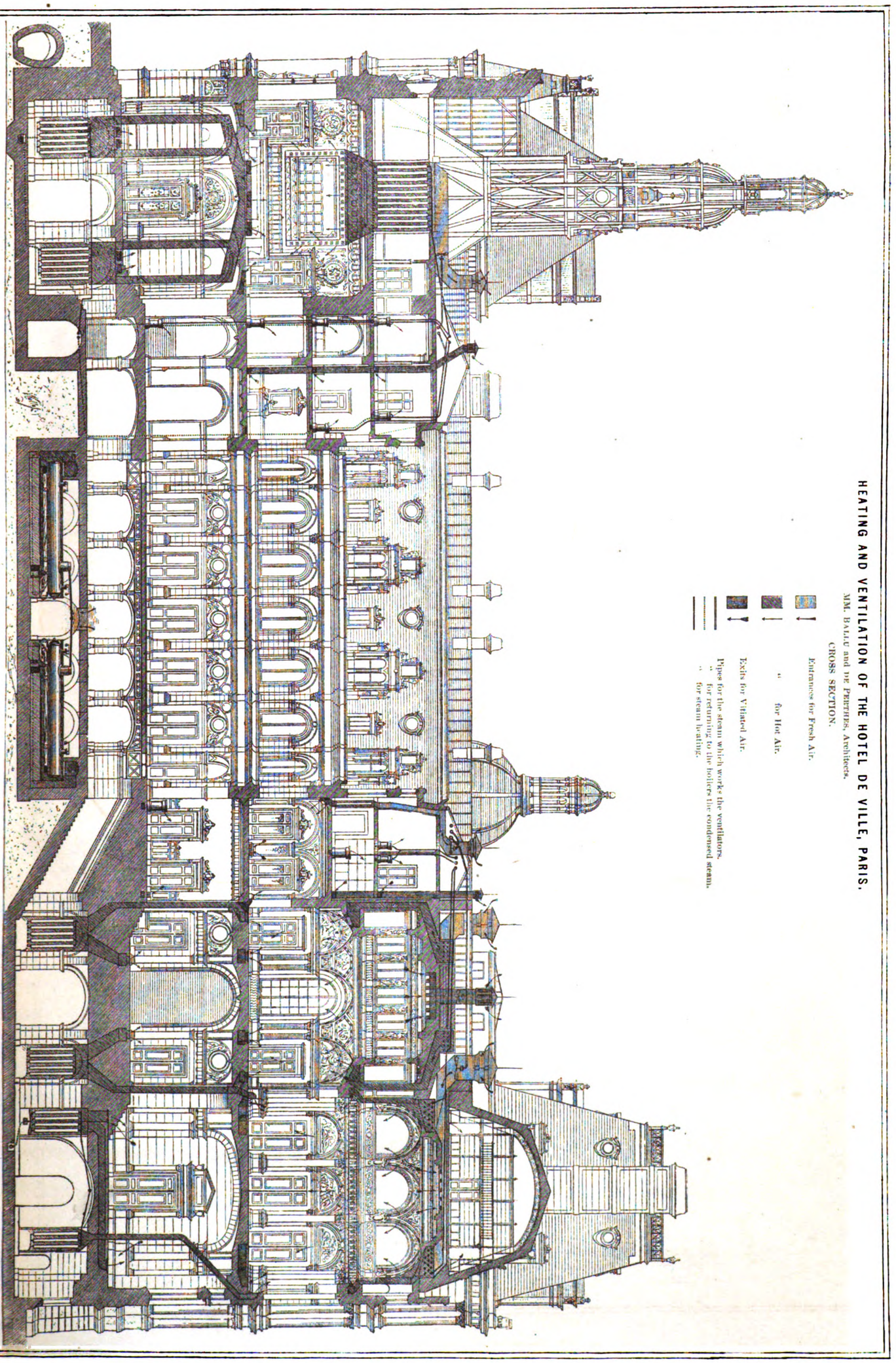

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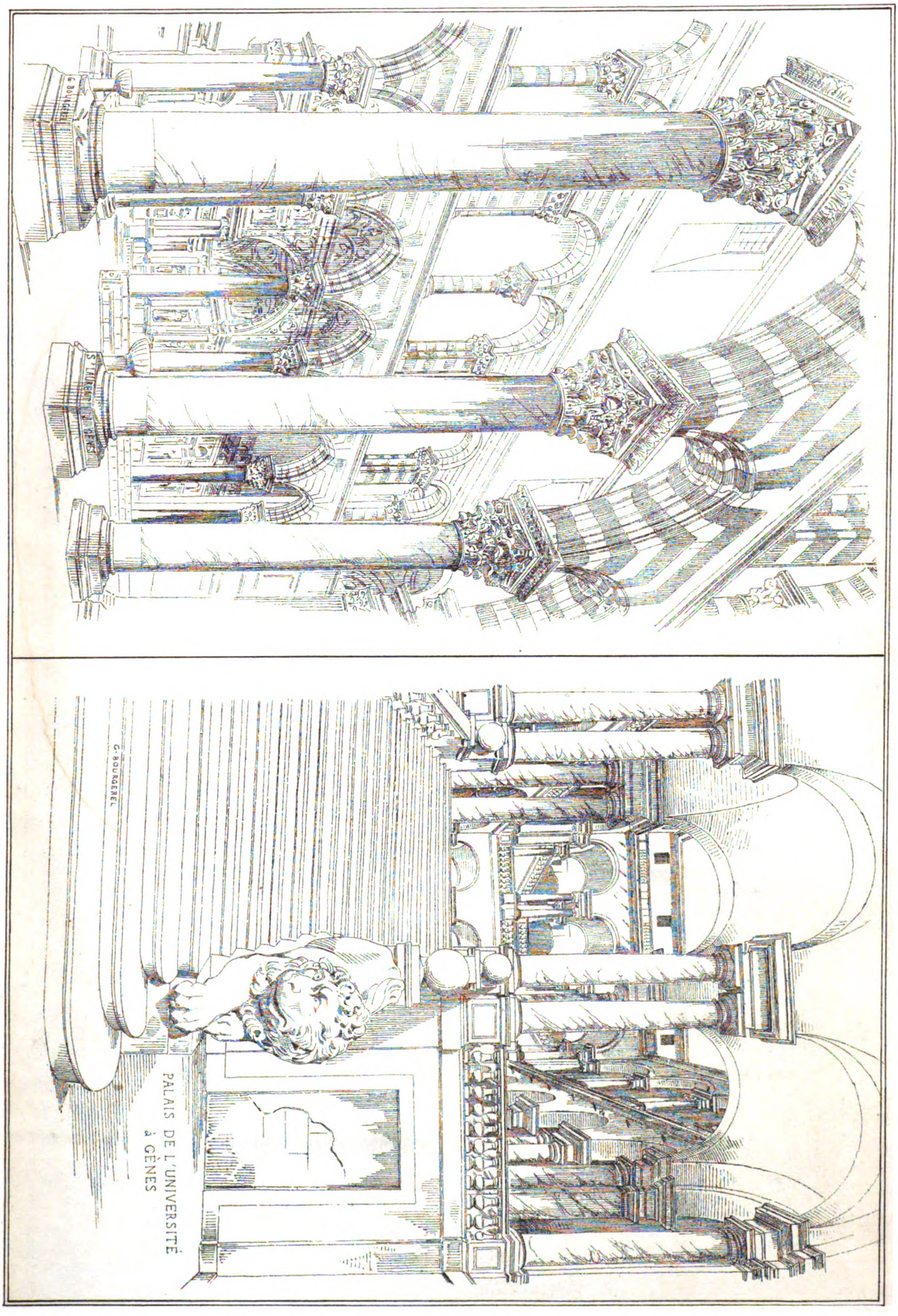

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, AUGUST 11, 1877.

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ON p. 237 of our number for July 28, we had occasion, in speaking of the efforts which had been made at home and abroad for ameliorating the condition of the poor by improving their dwellings, to refer to the remarkable progress made by our fellow-citizens of Philadelphia in this direction. Their experience in this respect is in the highest degree instructive and interesting, not only to political economists, who are aiming to convert the irresponsible populace into thrifty citizens, having an interest of property in the commonweal, but to architects, who will find that their own natural function in the realization of this important object has not hitherto been exercised as it should be. We learn from statistics collected by the Hon. Lorin Blodget, in an article in the April number of the *Penn Monthly*, entitled, "A Building System for the Great Cities," that since the year 1867 an annual average of 4,500 houses, or independent homes, of brick or stone, costing from $1,200 to $3,800 each, with a rental of from $11 to $25 per month, have been erected in the city of Philadelphia; and not more than 70 yearly of larger size. Of these, already from one-half to three-quarters are entirely owned by their occupants. A glance at our Building Intelligence of this week will show that this activity is still maintained. In New York the annual increase of dwellings of all classes is not over 500. The Philadelphia system, although frontage is not allowed upon any street narrower than thirty feet, gives in the districts occupied by houses of this cheaper class, a population of 78,000 to the square mile. This rather exceeds the average density of population in the large cities; so that the natural inference that districts of these small houses would become inconveniently large, and distribute the inhabitants too sparsely, does not seem to be justified. It is stated that some sixty thousand working-men with their families have thus been supplied with independent homes. Mr. Blodget describes the standard forms of the single house in Philadelphia as follows:—

"The form of building under the single-house system is established with much uniformity — perhaps too entirely uniform, some may say; but the necessities of the case admit only the best, and it can scarcely be denied that the forms employed are wonderfully successful. There are three primary forms, as they may be called, described as the two-story four-roomed house, the two-story six-roomed, and the three-story eight-roomed. They are always of brick, erected on stone-walled cellars not less than seven feet deep, 14 x 28 feet for the smallest houses, 14 to 16 x 42 to 45 feet for the six-roomed houses, and the same for the three-story houses of eight rooms, which differ from the larger two-story houses only in having three stories on the front and two stories at the back. All these are built in contiguous rows or blocks, with a common wall between them. No external or dividing wall is less than twelve inches thick, with hard or pressed brick for the outside, and salmon or light absorbent brick for the inner facings. There is little criticism possible upon either the materials or the mode of building of these standard houses, which have taken the place of all others almost, and are limited by well-defined building laws, so that there is scarcely any opportunity for the substitution of inferior structures. In fact, there is no temptation to do so: the great number annually built, and the facility of access to unbuilt suburbs, would deprive the careless or lawless builder of all profitable use for poor houses."

IN further illustration of the character of these cheap houses, which in this extraordinary experience at Philadelphia have been found so acceptable to the occupants, and of such incalculable use in improving the condition of the working-classes, we present on another page two sketches by Mr. Davis E. Supplee, architect, of that city, which appeared in February, 1876, in *Scribner's Monthly*, illustrating an interesting article by Mr. Charles Barnard, entitled, "A Hundred Thousand Homes." Plan B indicates the "back building," so common in Philadelphia and Baltimore; and plan C shows the extension in front when the family has increased in size and means. These houses are built in pairs, with an eight-foot passage between. The elevations indicate two methods of treating the principal façades of the "back buildings." But as these houses are built according to a rigid standard, with the utmost economy consistent with sound workmanship, and by a contractor who pays for the land a ground rent secured by the building erected thereon, the districts so improved present to the æsthetic sense a desert of monopoly, with no touch of beauty or grace, no varying charm of expression, to attract the eye and refine the mind. Mr. Supplee's sketch is an effort to obviate this defect. It is evident that the problem offers opportunities of design, both within and without, which are well worth the study of the architect, and which, if properly availed of, would confer upon such undertakings a new interest, and give them, as it were, a new faculty to exercise in their great work of civilizing. To this work our columns are always open, and we shall gladly publish any good projects for houses of this class, which would contribute any new thought toward the increase of their convenience, economy, and beauty.

WE have received from the publisher a very admirable, practical hand-book,[1] by Edmund Wrigley of Philadelphia, on the management of what are known in Pennsylvania as "Building Associations." This work, we believe, is accepted as the standard authority on this subject. It may not be generally known in this neighborhood that these associations are not *necessarily* concerned with building, but are more properly mutual saving fund and loan societies, based purely upon co-operative principles, and "consisting of a partnership in the profits of money as a money-maker, *equitably distributed* in proportion to the *severalties of capital* furnished by the individual members thereof." These associations are, we believe, mostly used by the same class of persons as in New England make deposits in savings banks. Each association manages its own affairs, and elects its own officers under certain wholesome legislative restrictions. Its members engage each to make a periodical (weekly or monthly) payment of a small sum (fifty cents to two dollars) per share into the common treasury, the ultimate value of the share being fixed at two hundred dollars. The capital thus collected is loaned in parcels, at periodical auction sales, to members at six per cent interest; those bidding the highest premium obtaining the loan. The amount of the premium is deducted from the amount loaned, and added to the loan-fund. The money earned by the association in interest, premiums, and fines, of course increases the value of the shares, which are generally used by the owners as collateral security for whatever money they may wish to borrow from the fund at the periodical sales. The facilities for borrowing offered by these associations are largely used by their members in the gradual process of purchasing their homes. This very safe, simple, and inexpensive system of co-operative banking is fostered by legislation in Pennsylvania and several of the Western States. Membership is apt to be limited naturally to neighborhoods and small communities. An admirable account of the practical working of the Building Associations is given by Mr. Charles Barnard as mentioned above; and the volume before us gives all the rules, examples, and explanations essential to a complete understanding of the subject. By the exertions of the Hon. Josiah Quincy of this city and others having in view the interests of the laboring

[1] How to Manage Building Associations; a Director's Guide and Secretary's Assistant, etc. By Edmund Wrigley. Second edition, enlarged. Philadelphia: James K. Simon, 29 South Sixth Street. 1876.

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classes, a law was passed last year in the Massachusetts Legislature, authorizing the formation of "Loan and Fund Associations," after the manner of those which have been so numerous and successful in Pennsylvania. We are glad to learn that several organizations are now in process of formation under this act. Indeed, one of these associations had its first meeting and sale of loans on the evening of August 6, in Boston. At this meeting Mr. Quincy stated that there are four hundred and fifty organizations of this sort in the city of Philadelphia alone, and that there had not been an ultimate failure in one of them. He also announced that at least seventy millions of dollars had been invested in these associations, while there are but fourteen millions in all the savings banks of that city.

THE vestry of Trinity Church, Boston, has printed together with the sermon delivered by the Rev. Dr. Vinton at the consecration of that church, Feb. 9, 1877, an historical discourse by the rector, the Rev. Phillips Brooks; and a description of the building by Mr. H. H. Richardson, one of its architects. This description includes just such a narrative of the incidents of construction, just such a statement of the practical difficulties encountered, with the method of surmounting them, as should be prepared for the use of the public and of posterity in the case of every important building. Every such structure is intended to be in some respect an improvement on its predecessors. We generally can look for the marks of progress only among those features which are evident to the eye; but those which are concealed in the structure, and which are hardly less instructive and useful, are soon forgotten. We quote in another column from Mr. Richardson's narrative those passages relating to the foundations of the four piers of the central tower, which is fifty-two feet square; these foundations, as they were laid upon "made land" with a treacherous substratum of mud penetrated by the tides, required very exceptional care in their construction. We notice that the architect characterizes the style of the church as a free rendering of the French Romanesque of central France; and meets the objection so often made as to the subordination of nave and transepts to the central mass of the tower by referring to some characteristic features in the churches of Auvergne, in which, as he says, "the central tower, a reminiscence perhaps of the domes of Venice and Constantinople, was fully developed, so that in many cases the tower became, as it were, the church, and the composition took the outline of a pyramid, the apse, transepts, nave, and chapels forming only the base to the obelisk of the tower." Accepting this as a solution of the problem, he considers himself justified in making his tower central and the principal object in all his façades. Mr. Richardson does not formally acknowledge his indebtedness for the *motif* of the tower in general aspect and details (especially in the earlier studies of it) to the lantern or *cimborio* of the old cathedral of Salamanca, which is so much admired by Street, and which is essentially Spanish in its character. The original design, as we remember it, had more of the Auvergnat character, in the low square tower surmounted by a slender octagon lantern, as at Issoire, Brioude, Clermont Ferrand, Riom, and other churches of the district; all of which by the by, had, we believe, naves of from five to seven bays, — an offset to the height of the tower, the absence of which in the Boston example we cannot help regretting. In these churches somewhat of the pyramidal effect to which Mr. Richardson refers can be seen from all points of view, except those which comprehend the length of the nave. But we recognize of course that the exigencies of Protestant worship require rather the compactness of an auditorium than the "stretched metre" of a processional nave; and we can hardly blame the architects that they have faced the grave difficulty so frankly, more especially as, in doing so, they have given us in the tower a composition so manly and refined, so vigorous and so well studied in execution, that it is well worthy of its pre-eminence in the design both within and without.

WE are glad to state that a meeting of the Trustees of the American Institute of Architects has been called for the 16th inst., to consider the question of the Washington Monument. The Institute, representing as it does the entire profession in this country, can hardly afford to remain silent in such an emergency; and its advice, if offered, cannot fail to be received with consideration and respect.

WE fear it cannot be denied that the new school of architecture which has arisen here and in England since the mediæval revival has in great part lost that sensitiveness to harmony of proportion and to refinement of detail, that studied elegance and purity of line, which distinguished the best works of the Renaissance, and which still admirably prevail, unsubdued by fashion, in the practice of the *École des Beaux-Arts*. As regards the effect upon the student, the substitution of the height of a man for the diameter of the column as a unit of proportion has brought with it consequences of the greatest importance, and is in many respects to be regretted. In the beginning, the practice of the picturesque, the quaint, the archæological, cannot take the place of the practice of precision and order without begetting just that looseness of habit in design and that imperception of symmetry and balance of parts which characterize the minor works of modern architecture, as illustrated not only in our own pages, but in those of the English *Builder*, the *Building News*, and the *Architect*. The education which causes the young architect to impress upon his works the idea of novelty and variety, rather than of correctness and simplicity, which encourages his imagination rather than purifies and chastens it, can scarcely be a wholesome discipline. For these reasons we think it may be stated with confidence that a form or style which has become academic, and, by the accumulation of thought which has been bestowed upon it by successive generations of artists, has crystallized into types, standards or orders, is better fitted for the training of the architectural student than one which has been given to us by the archæologists, which is not hedged about by artistic traditions, and, for its proper expression, is not dependent upon the fine mutual relations and exact adjustments of its minutest parts. A student who has not been trained to a condition of fastidiousness or sensitiveness in regard to the outline of a moulding cannot compose in any style without betraying sooner or later a want of feeling or an illiterateness which is fatal to good architecture. It is as true in art as in morals that one must be faithful over a few things before he can be ruler over many. The classic orders may thus be considered the primer of design; if they are not mastered in the beginning by the student, he can hardly express his thought grammatically even in mediæval language. It is true that Edwin von Steinbach, Robert de Luzarches, William of Wyckham, were great architects in their day, although they knew nothing of the Doric or Ionic orders; but they were great *notwithstanding*, not *because of* this ignorance. The conditions under which they designed are not the conditions under which we design; the modern ideal cannot exclude the consideration of any of the precedents of style which are available in the books. It has been remarked that the graduates of the *École des Beaux-Arts* who have come to this country to practise, so far from being cramped in their methods by the classic limitations of their studies, adapt themselves to their new circumstances, and express themselves in any architectural language, whether classic or Gothic, brick or stone, or even in our own wooden vernacular, with a facility, freedom, and correctness, a grace and an elegance, beyond the reach of any who have not enjoyed similar advantages. The curriculum of such architectural schools as that of the Massachusetts Institute of Technology already promises results at least equally good. Let us hope that they will leaven the lump.

IN the midst of the freedom (shall we not say license?) which has been engendered in modern work by our mediæval habits of design, the reproduction of the brilliant sketch of Döllinger, in the present number, may perhaps be accepted as a matter of refreshment, if not of instruction, especially as the subject of the sketch is a purely academical composition, executed with the greatest spirit consistent with the precision and correctness of classic form. It is far from our intentions to renew in any way the barren battle of the styles; but we believe the most uncompromising of the modern mediævalists cannot but be filled and revived by a piece of work so elegant and masterly as this Neapolitan arch. *Fas est et ab hoste doceri*. We may be permitted therefore to

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ask our younger professional readers to note in especial, the harmonious proportional relations in the heights of the four successive stories in this design, no two heights being alike; and, for the enforcement of the contrast, the two narrower stories or divisions alternating with the two wider. Observe also the ingenuity with which the important incident of the sculptured procession of triumph, instead of having a mere frieze enlarged to receive it, has an order to itself, with its own frieze so decorated as not to compete with it. Note also the elegant device by which the triumph moves quite across the monument without interrupting the breaking of the order over the coupled columns; and how the triumphal car, instead of being placed directly on the centre, as an inferior hand would have disposed it, moves *toward* the centre so as to give the impression of movement. Moreover the multiplication of horizontal mouldings across the die of the pedestals under the principal order, and the great spread of the mouldings of the base, are infringements of the fixed formulas of the order, for the sake of an expression of force needed at this point. Again, in the general disposition of sculpture there seems to be an intention in each successive story, to represent a higher thought than in the one below; thus the earthly dignities, as set forth in the armorial bearings on the keystone with the supporters in the spandrels of the first stage, are less in their significance than the incident of the triumph which occupies the second. Then we may suppose under the arch of the third stage, with the Victories in the spandrels, the mounted hero in a great alto-relief, at last beyond the reach of praise, immortalized; and finally in the attic stage there are the personifications of the four cardinal virtues under which he triumphed. But what concerns us most to note is not so much the poetical element in this design as the elegance and freedom with which the architectural idea is set forth in the purely conventional forms of the Renaissance; and that these forms constitute, as it were, a polite language, which cannot be made available to any one without a careful training, which meanwhile educates the eye, refines the taste, gives sweetness and strength to the hand, and, in short, makes the artist.

MR. SHARPE'S PAPERS ON CHURCH ARCHITECTURE.[1]

THE reading of the latest number (the third) of Mr. Sharpe's Illustrated Papers on Church Architecture reminds us how much his profession has lost lately by the death of some of its leading writers. Mr. Sharpe's death was an especial loss in that it took him away from the midst of several investigations, or rather, perhaps, several branches of one investigation, of which he was gradually bringing forward the results in this series of papers. He was perhaps the first of living authorities — doubtless the first among Englishmen — on the architecture of the Cistercians, the great branch of the Benedictine order to whom most of the abbey churches of England were due, and the peculiar characteristics of whose building were at least coincident with, if not the causes of, some of the distinctive forms of English church architecture. At the time of his death he was still occupied with this subject, and with the closely related one of the transitional period; and it was, as our readers will remember, while collecting materials for this study among the churches of northern Italy that he caught his fatal illness.

An acute observer, clear and careful in his conclusions, with a mind full of the detail of his study, he had made studies of great value, but had never, so far as we know, collected the results of his work in any continuous statement, though the several detached essays which he published were gradually accumulating into material which, if he had lived and had chosen, he might have combined and digested in a very valuable treatise on the architecture of his favorite period. This is what we, and no doubt others of his readers, had hoped he would ultimately do; and the impossibility of it now is a cause of peculiar regret. The two earlier numbers of the Papers on Church Architecture were devoted to the special discussion of Cistercian architecture; with them may be counted other papers on the same subject before published, and in fact a great part of the matter of his large work, the Parallels. The last number, which is before us, is on the Ornamentation of the Transitional Period in Germany, and allies itself naturally with his treatise on the ornament of the same period in England. The whole series, it will be seen, covers but a short range in the history of architecture, and might, with other material which Mr. Sharpe is reputed to have accumulated, and what he could have added to it, have been wrought into a very valuable account of the development of monastic architecture into the completed Gothic of the thirteenth century. This is a work which has never been satisfactorily done, we believe, and which yet seems to us as interesting and historically as important as the study of any subsequent period.

The number before us contains twenty-one quarto plates on copper, from drawings made by Mr. Sharpe some forty years ago. They are drawn with the clearness, decision, and intelligent emphasis that characterize Mr. Sharpe's illustrations, and consist of plans, general views, and details of a number of interesting examples of the German architecture of the twelfth century; the date of that which he considers the latest being fixed at A.D. 1200. The expression "Transitional Period" is in its nature somewhat indefinite. Mr. Sharpe extends it over a wider range — at least in examples, for he does not fix many dates in this paper — than we were prepared to see. In some of his plates, in fact, there are few or none of the peculiarities which we are accustomed to ascribe to the transition. As he puts it, the transitional period in Germany ranges over the second half of the twelfth century to the very beginning of the thirteenth. Indeed, he adds: "There is reason to believe that throughout the whole of the first quarter of the thirteenth century, if not later, architectural art in Germany continued to be characterized by an ornamentation similar to that illustrated in the following pages, and by other features peculiar to the true Transitional Period."[1]

The paper does not pretend to be a treatise: it is simply a collection of examples with a brief commentary to each. The reader is often tempted to wish that the commentaries were fuller, — that less was taken for granted in the way of general knowledge, and more given of general illustration. What text there is, however, is like the drawings, clear and to the point. The last and presumably the earliest of the illustrations is the very curious and instructive little chapel of St. Walderic, at Murrhardt, a small building of a single vaulted bay and pyramidal roof placed diagonally, which is very suggestive of the upper story of a twelfth-century Rhenish tower set upon the ground, with an apse built against one of its faces. Round the apse a triangular arcade like those which belong to what the French call the *Style Latin*, as seen, for example, at Lorsch and St. Jean de Poitiers, is combined with the richest advanced twelfth-century ornamentation. The chapel of St. Eucharius at Nuremberg greatly resembles in style the better known and elegant little church of St. Andreas at Cologne, but is much earlier or at least ruder, both in mouldings and capitals. Its striking peculiarity in vaulting is worth notice. It is planned in two equal aisles of three bays, the vault of one aisle being round and the other pointed, while both are identical in detail and rest upon the same row of dividing columns; and there is no reason to suppose that they were not built together. The illustrations from Maulbronn, Heilbronn and Ebrach are quite in the range of Mr. Sharpe's other work, being all portions of Cistercian monasteries. The doors of the refectory at Heilbronn is a fine example, — a trefoiled door fitted with quaint awkwardness under a round arch. A queer discrepancy is to be noticed between the print given of it in Lübke's history, and Mr. Sharpe's. In Lübke's the moulding around the trefoiled door opening is finished at the bottom as a stop-chamfer; in Mr. Sharpe's it runs to the ground. In the first a prismatic shaft on the left is enriched through its whole height, in the second only in the half above the ring. The Byzantine ornament in the irregular tympanum between the round arch and the door-head is very differently treated. Both are equally clear and positive, and the differences are a good example of the difficulties in evidence with which the architectural student too

[1] Illustrated Papers on Church Architecture. By Edmund Sharpe, M.A., F.R.I.B.A. No. III. November, 1876. The Ornamentation of the Transitional Period in Germany. London and New York: E. & F. N. Spon

[1] We ought to explain that the text actually reads, "there is no reason to believe." As the reader will see, however, it is impossible to believe that the word "no" is any thing but a clerical error. Mr. Sharpe mentions the noteworthy statement of De Lassaulx that the same archbishop in the same year, 1248, dedicated at Cologne the transitional church of St. Cunibert, and laid the foundation-stone of the cathedral.

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often has to contend. The large-scale detail given by Mr. Sharpe seems to show that he is in the right, and suggests that in this case the German draughtsman probably "cooked" his detail a little when away from the original.

At another point, however, we find Mr. Sharpe tripping; for the text says of his first example that "the whole chapel was vaulted with simple quadripartite vaults," while in the plates the plan indicates that the vaulting of the westernmost bay of the nave is hexapartite, while the interior view shows two hexapartite bays out of three. This chapel of St. Michael, in the Cistercian abbey church at Ebrach, is the latest and the most fully illustrated of Mr. Sharpe's examples, — a charming little cruciform chapel, a miniature in form and proportion of plan of the church to which it is attached, which had already been illustrated in the second paper of the series. It contains in small compass all the most characteristic features of German transitional architecture; trefoiled wall arcades with quatrefoils sunk in the spandrels, cinctured columns, piers of clustered shafts, corbelled vaulting shafts, those of the diagonals with their square abaci set across the angle, a pointed vault, mixed in form as we have described, and ribs moulded with stop-chamfers. There are swelled shafts and capitals of all types from the complex German sculpture of the twelfth century to the French crocket capitals of the thirteenth, and even fair specimens of the Early English banded capital, but with a square abacus; and this while the mouldings are remarkably uniform throughout and apparently all transitional. The whole has the fine combination of lightness and solidity, of richness and animation with breadth and without restlessness, that distinguish the best transitional work of middle Europe, and of which the church at Gelnhaussen is perhaps the most brilliant example.

In the preface to this number Mr. Sharpe promised to follow it by others devoted to the transitional period in the north and west of France. It was said at the time of his death that a part of this promised material was nearly ready for publication: we sincerely hope that some means will be found of giving it to the world.

THE SET OF CEMENTS AND MORTARS.

BY a curious misuse of terms, one of the earlier writers on cements, quoting Dr. Higgins, whose work was published in 1780, divides all the lime compounds into two classes, — "*calcareous*, or those which are used for works exposed to the air, and *hydraulic*, or such as are used under water." Now, we must include all building cements under the first of these terms, for "calcareous" simply means partaking of the nature of lime. But the second term has long been very properly applied to such calcareous cements only as possess the power of induration under water. Vicat, a French writer, proposed a much better subdivision of limes into classes. His terms were as follows: 1, Fat; 2, Lean; 3, Moderately hydraulic; 4, Hydraulic; and 5, Eminently hydraulic limes. In the present day we employ the terms fat and poor limes, hydraulic limes, and cements, which seems a very fair and natural classification. Leaving out of the question altogether the compounds of magnesia and similar non-calcareous cements, and that class of cements of which sulphate of lime, or gypsum, is the basis, we propose to glance at the so-called set, and the induration of the commoner limes and cements, and, in the course of our observations, to deal with the use of those agents usually employed to promote the hydraulicity of mortars.

In the process of burning chalk or limestone, as it is well known, the carbonic acid gas is more or less completely expelled, and the lime used by the builder is quick or caustic lime, the oxide of the metal calcium; the cements we use being chemically impure silicates of the oxide of calcium. The pure or fat limes are those which consist of pure oxide of calcium; the poor or lean limes contain varying proportions of silica, iron, and alumina. Such limes as contain considerable quantities of silica only are quite unfitted for the builder. The fat limes are the easiest to burn, as they simply require steady and long-continued heat, while limes containing clay and ferruginous matters are liable to fuse, or run into a clinker in the kiln. At a less degree of heat, they readily blue, or turn of a bad color; and some impure limestones splinter or shatter into pieces in the kilns, and spoil the draught, unless the heat is very gradually applied. The natural cement stones, such as those of Harwich and Sheppey, are the nodules of argillaceous limestone which exist in many clay strata. The nodules of the London clay burn into an excellent Roman cement, and cements of this class are fired at a very low temperature. Portland cement is a mixture of lime and clay artificially compounded and burned to incipient vitrification. We have in this country many clay shales and limestones which contain naturally the proper proportion of lime and clay to form Portland; but, so far as we know, they have never yet been utilized for the preparation of cement. At Rugby, however, the lias shale is ground up with small quantities of lias limestone, and manufactured into Rugby Portland cement. Some of the Medway cement-makers also employ the gray or soap-lime with smaller proportion of clay in lieu of the white chalk-lime and clay formerly in sole use for Portland making.

The induration of pure limes is much better understood than that of compounds of lime, silica, and alumina. Lime made from white chalk or mountain limestone, when properly slaked, goes abroad into a bulky powder, chemically termed hydrate of lime. The particles of this powder are extremely minute. Slaked lime is, in fact, one of the finest powders in nature; one hundred parts of chalk are reduced by burning to fifty-six parts. The quicklime thus obtained absorbs on hydration, or slaking, eighteen parts of water, which it solidifies. This slaked lime forms, if mixed with an excess of water, a pasty mass, which dries into a friable powder of hydrate of lime. If the quantity of water is barely sufficient for the slaking of the lime, we obtain, in lieu of the very fine powder, a granular coarse hydrate, — a crystalline hydrate, in fact, — and the lime is said to have been "chilled." Slaked lime — except when employed as putty or for white-washing — is always used by the builder, in combination with sand, to form mortar. When properly amalgamated, this mixture of lime acquires, in from twenty minutes to half an hour after it has been employed for the purpose of the bricklayer, a certain amount of consistency, or a species of pseudo-set. This is the first set: the real set, or induration, takes place in the case of pure lime mortars, after a long interval of time, and then only at the surface, working gradually inwards. The first set is, we believe, mainly due to the absorption of the water in the mortar by the porous brick or stone, and it has nothing to do with the real induration. The genuine set is partly due to re-conversion of the hydrate of lime into the carbonate of lime, by the carbonic acid of the atmosphere, and partly to the formation of silicates of lime, in the wet way, by a combination of the hydrate with soluble silicates present in the sand. It has been supposed that lime has the power of very slowly acting upon silica, when intimately mixed with it in the presence of moisture. It will be understood from this that it is of the utmost importance to insure a very complete and thorough admixture between the slaked lime and silicious sand; indeed, the nature of the set very greatly depends on the perfection of the tempering of the mortar. We read in all the old works on building, of the "beating" of the mortar; and formerly great attention was paid to this. It was thought a fair day's work for a laborer in 1750 to beat up twenty-five bushels of lime and thirty-six bushels of sand into mortar. By this beating, the particles of lime and sand were forced into very intimate admixture, and a first-rate mortar was produced.

The size of the grains of sand, and their shape, have also a very notable influence upon the quality of the mortar. A large-grained sand is invariably found to produce a better mortar than a small-grained sand. It is of advantage that there should be a considerable inequality in the relative sizes of the particles of sand. Water-worn sand is unfitted for mortar-making: the sharper the sand, the better. The object of adding the sand to the slaked lime is to provide proper points of attachment for the particles, and numberless interstices for the air to enter; and in tempering the mortar, we must take care that each grain of sand is entirely coated with the lime. Fine sand requires relatively a much larger proportion of lime than coarse sand, simply because the superficial area to be covered in the former case is much greater than in the latter. It has been sometimes asserted that if we measure the voids in any sand, we can arrive at the volume of lime which will be required for the preparation of mortar; but this is, we believe, an improper mode of estimation, as by this test, the larger the grains of sand, the greater would be the relative proportion of lime which a sand would need, while the finest-grained sand would want the least lime, instead of the most. Many authors have experimented upon various kinds of sand, and the evidence upon the subject is somewhat contradictory; but from our own experience, we incline to the theory we have first stated. The influence of pressure or compression upon the set of lime and cement-mortar is remarkable; and the reasons for this will be evident to those who have followed us in these observations: for, under great pressure, we obtain a very perfect and intimate junction between the sand grains, the lime, and the materials cemented together. We know of no tabulated set of results showing the exact effect of pressure upon the set of a series of mortars as contrasted with the set of similar mixtures not subjected to pressure; but experiments of this kind would be of great interest, and we commend the inquiry to the attention of our readers.

Thus far we have occupied ourselves mainly with the set of limes and lime mortars of the ordinary kind. We will now pass on to a brief investigation of the set of cements and cement mortars. There are many limes of the kind termed in some of our former articles on kindred subjects "intermediate limes," which, when dipped in water and withdrawn several times, do not rapidly, or even after the lapse of some considerable time, heat and burst into a fine powder. Instead of behaving as other limes, they perhaps fall to pieces after a while, and either crumble gradually to dust, or such pieces may eventually become hard. If in the latter case we weigh a sample of the burnt stone before it is dipped in water,

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and then, after it has been allowed to remain for some weeks in its shattered state, we collect and carefully dry at 212° all the broken fragments, we shall find that the lime has gained in weight, not perhaps quite as much as pure lime would have done (viz., the third of its weight when newly burnt), but still some considerable amount. Our lime sample has, in fact, solidified its water of hydration, and that without passing into the bulky powdered condition of the ordinary hydrate; and it is thus a true cement, this being the mode of discriminating between a lime and a cement. An intermediate lime (a term proposed by the French writer Vicat) is therefore a lime which behaves partly as a lime, and partly as a cement. If we still continue the examination of the sample we have just had under notice, and in lieu of dipping the lump into water, we in the first instance reduce it to powder mechanically, we have a specimen of the ordinary cement of commerce.

Cements may, for facility of reference, be divided into two classes, — quick-setting cements and slow-setting cements. These classes might be much subdivided; but for our present purpose the classification is sufficient. Quick-setting cements are relatively lighter in weight, darker in color, and richer in silica, iron, and alumina, than the slow-setting cements. We may take a Roman cement as a type of the former class, while Portland is the ideal cement of the latter class. Roman cement may either, as we have seen, be prepared from natural cement stones, or be obtained by the mixture of clay and lime in certain proportions. The characteristic of the cement is its inability to carry much sand, its adhesiveness to the materials to be cemented together, and its tendency to spoil rapidly when exposed to the atmosphere. Portland cement, the type of the other class, is exactly the opposite to it in each of these features. Roman cement is ruined by more than two parts of sand. It works so fat and rich under the trowel, that the plasterer delights to use it; and we cannot keep it open for more than a week or two without having it utterly spoiled. The set of Roman cement is due to the formation of a compound silicate of lime, iron, and alumina. In the darker cements, the iron is always in considerable excess. It is not absolutely necessary that a quick-setting cement should be dark in color (some are very pale); but we generally find a large quantity of iron in them, to which they owe their color. We cannot give very satisfactory reasons why the quick-setting cements carry so little sand. It may be caused by the imperfect nature of the silicates which exist in them only in a state fit to be called into activity by means of moisture, and incapable of being formed when diluted with sand. Portland cement requires to be burnt at a very much higher temperature than a cement of the quick-setting type. The heat of a Portland kiln would fuse the Roman cement into a black glass. We have in former articles described the preparation and set of this cement, and we need do no more now than state that its excellence is chiefly due to its great density, to its power of remaining unchanged for a considerable time exposed to the air, and to the readiness with which it will carry large proportions of sand. The silicates of the Portland type are very different from those of the Roman cement type. They are mainly formed by heat, and on coming into contact with water, they combine chemically with it to form hydrated silicates. The Roman cement compounds are probably more of the nature of silicates formed in the wet way by lime, iron, and alumina, in the presence of silica and moisture. If we burn a Roman cement to the point of partial vitrification, we obtain a slag which, on being ground to powder, shows no tendency to combine with water. The silicates have, in that case, been already formed by heat, and being insoluble, the resultant powder is useless for the builder's purpose. The chemistry of these cements has been much more carefully studied by German chemists than by our own countrymen; and the theories we have just advanced must be taken more as suggestions than as actual facts.

M. Schott, who has devoted very great attention to the curious and novel cement action of lime in the presence of minute quantities of sulphuric acid, which has been discovered by his English namesake Gen. Scott, and by him termed "selenitic action," has made known some very remarkable properties which are exerted by quicklime under certain conditions. He says that if we mechanically reduce quicklime to powder, and ram this powder into a strong metal cylinder, closed when full with a screw cover, and perforated all over with very minute holes, and then, by placing the cylinder in a vessel, allow water to enter slowly, we effect the hydration of the lime much after the manner of a cement, and we obtain a cake of dense hydrate of lime entirely different to the bulky powder which is produced under ordinary circumstances. He likens the material thus obtained to Gen. Scott's selenitic cement, which chemically is a hydrate of lime formed without much heat, and without the ordinary slaking action. We have not yet seen any explanation of the selenitic action which quite accounts for all the phenomena; and we have in a previous article stated what Gen. Scott's own theory is in regard to the set of his cement. — *The Building News.*

CHAPEL OF THE PALACE OF VERSAILLES. — Important restorations are going on at the chapel of the palace of Versailles, in the form of replacing and repairing the sculptures and other decorations of the building.

THE ILLUSTRATIONS.

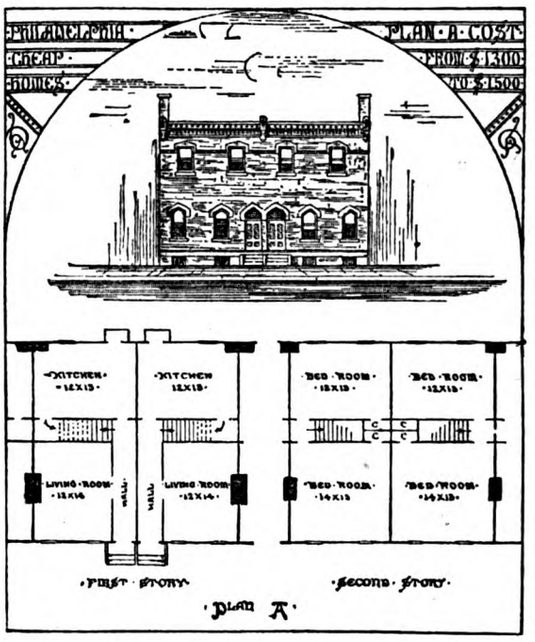
THE ADAMS BUILDING. MESSRS. CUMMINGS AND SEARS, ARCHITECTS.

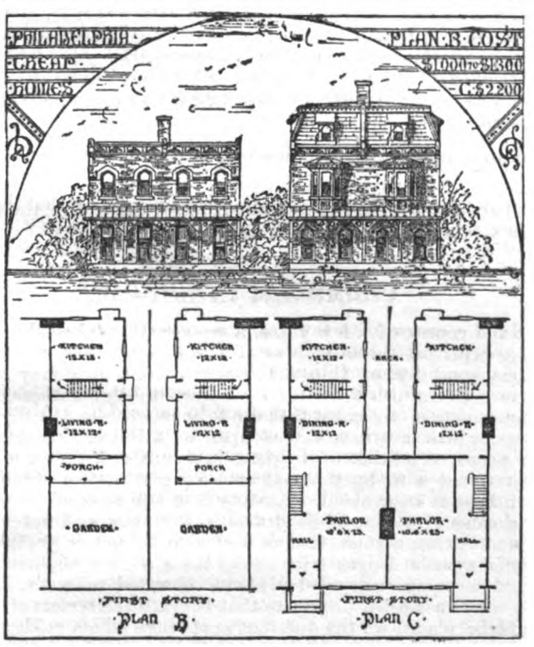
(9 Pemberton Square, Boston, Mass.)

THIS is a building intended to be occupied chiefly by lawyers. Having a depth of 160 feet and a frontage on Franklin Avenue of 70 feet, it affords space for some forty offices, of various sizes, but all convenient, well lighted, and easy of access. An elevator runs from the second floor to the top of the building, and a fuel-lift from the cellar to the top. The Court-street front, of which a drawing is here given, is forty-one feet wide, and of Amherst stone.

PHILADELPHIA CHEAP HOMES.

These sketches, which first appeared in *Scribner's Monthly* for February, 1876, are referred to in our Summary.





PROPOSED METROPOLITAN MUSEUM OF SCIENTIFIC INDUSTRY, NEW YORK, N.Y.

As explaining the illustration of this proposed industrial museum which our New York correspondent has mentioned more than once, we print the letter addressed by the architects to the Mayor of New York.

SMITH ELY, ESQ., MAYOR OF THE CITY OF NEW YORK.

Sir, — To engage in successful competition with other nations in the industrial arts, it is requisite nowadays that the hand of the artisan should be guided by the light of science, and it is evidently desirable that he should be enabled at a metropolitan centre to study the best examples of what others have done and are doing.

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At present there is no permanent educational institution of a polytechnic character in this country, except so far as the exhibition just commenced at Philadelphia may be considered as such; but it is probable that the time will shortly come, in the city of New York, for an active movement in this direction, and it seems clear that whenever a museum for such purposes is wisely organized here, it will be as much the duty of the State to aid in its establishment as in that of a museum of art or natural history.

It appears to us that the proposed abandonment of the Distributing Reservoir on Forty-second Street, and the consequent possession of a very eligible site, offers to the city of New York the opportunity for taking an important initial step towards the realization of this idea, entirely distinct from any present purpose of erecting a building; and we desire to lay before you, as chief officer of the city, a practical suggestion for the utilization of the ground, so that, if considered advisable, steps may be taken to secure it for the establishment of a Metropolitan Museum of Scientific Industry.

As will be seen by an inspection of the drawings now submitted, we show the feasibility of erecting at a proper time a building covering the entire area of the present reservoir, and consisting of, first, a hall or pavilion, 390 feet square, covered by an arched roof of 135 feet high from floor to ceiling, resting on outer walls, and converging to a central shaft or column; second, a corridor, with gallery over, surrounding the hall. The total floor space thus given will be about five and a half acres. The central shaft will contain stairs and lifts, giving access interiorily to a balcony under the ceiling, and exteriorly to a covered platform 175 feet from the level, which is intended as an outlook and open air refreshment-room.

Provision is made for an orchestra at the base of the vertical shaft, and a portion of the floor is furnished with seats for the audience.

Communication will be made with the park on the west side, with suitable approaches, etc.

By the mode of construction and arrangement proposed for lighting and ventilation, it is believed that the inconveniences arising from the glare and heat of the sun will be much less than is usually experienced in buildings erected for purposes of an analogous character.

Full provision for heating, and for the accommodation and convenience of visitors, has been made; and from the result of a careful estimate based on present prices, and assuming that the site is cleared to the level of Fifth Avenue, it appears that such a building could be erected in a substantial and complete manner for $850,000, exclusive of terraces and work on park approaches. We remain, sir, yours respectfully,

VAUX AND RADFORD, *Architects.*

THE TRIUMPHAL ARCH IN THE CASTEL NUOVO AT NAPLES.

(See Summary.)

This was erected in 1470, to commemorate the entry of Alphonso of Aragon (June 2, 1442), by Pietro di Martino, a Milanese architect, or, according to Vasari, by Giuliano da Maiano of Florence. The sculpture of the triumphal entry is by Isaia da Pisa and Silvestro dell'Aquila. In the frieze of the lower order is the inscription, "ALPHONSUS. REX. HISPANUS. SICULUS. ITALICUS. PIUS. CLEMENS. INVICTUS." In the frieze over the Triumph is the inscription, "ALPHONSUS. REGUM. PRINCEPS. HANC. CONDIDIT. ARCEM." In the attic are the four cardinal virtues. The archway covers the curtain wall between two vast round mediæval bastions.

HOODED MANTEL IN THE HOUSE OF MR. H. I. SHELDON, CHICAGO, ILL.

It should be said in explanation of the drawing, that the opening above the mantel-shelf is a window.

COMMUNISM IN HOT-AIR.

IN the course of a few years, a cross-section taken through one of the principal thoroughfares of one of our cities may reveal a curious condition of things below ground, which may at some future time furnish food for discussion to the antiquaries and archæologists of the races that are to succeed us. Already are the sewers, which are now looked upon as the most important aids to a proper condition of hygiene in towns and cities, sufficiently interfered with by the systems of pipes, both gas and water, which have to be avoided. Already is traffic so much impeded by the closing of streets while drains, sewers, gas and water mains, are undergoing repairs, that it seems to be not improbable that traffic may be at length driven from the streets altogether, and be carried on upon suspended viaducts, elevated railways, or roads upon the house-tops. Suppose that beneath the streets of one city should be placed all the different appliances which modern invention has contrived to meet the exigencies of rapid communication, of health, and of the comfort and convenience of home life. It would be a matter of the most serious study to so arrange these different systems that all might be readily reached for the purpose of repairs, and so that they might not interfere with one another. Thus, besides the sewers and gas and water mains which all cities now have, a city might have its foundations honeycombed by tunnels for underground railways, as at London; by tubes for pneumatic despatch, as at Berlin; by tubes containing telegraph-wires, as at Paris; by pneumatic tubes, which, as at Vienna, supply air to the pneumatic clocks; by pipes which furnish houses and factories with steam, as is being done at Lockport, N.Y., by Mr. Holly; by pipes which shall furnish houses and more particularly hospitals with fresh air, as is proposed by M. Autier, who has contrived a well-considered scheme, which there has been some talk of putting to a practical test in the great buildings of the International Exhibition of 1878, and if the system stands the test, it is to be permanently applied to the hospitals and public offices which are in that part of the city, and finally be so extended that any one may have fresh air "laid on" as well as gas or water. But besides being able to do away with privy-vaults, pumps, lamps, steam-generators, clock-cases, and open doors and windows, the modern householder may in the future do without furnaces, stoves, and open fires, if he so chooses; for Mr. William Bliss, of Springfield, Mass., after several years of patient study and perseverance, has obtained a patent upon a system by which hot air is to be furnished to consumers in any desired quantity and degree of heat from a central station. The practicability of the system depends mainly upon the fact that compressed air retains, and consequently can transmit, heat better than air under ordinary pressure, which by the process of heating has become rarefied. It also has this important property, that it can be moved in any desired direction, and is not, as is ordinary heated air, restricted to an upward motion.

Condensing pumps driven by steam or water power, situated near the heating-furnace, will force air through the furnace and thence through the mains. If the pumps are driven by steam, a saving is to be effected in the cost of generating the steam by placing the boiler on top of the furnace which heats the hot-air pipes, so that the heat in passing from the furnace to the chimney must pass through the flues of the boiler and so generate steam.

As it is likely that, in spite of all precautions that may be taken to prevent its loss, it will be impossible to deliver heat of sufficient power at distant places, or at certain places where an exceptional degree of heat is required, reheating-furnaces are to be established at different points upon the main line where it may be thought necessary. The mains and branch pipes which offer the best chance for the loss of heat are to be placed inside of concentric sheaths, the inter-space being filled with some non-conducting material.

Mr. Bliss does not propose to blow hot air into dwellings, but to cause it to circulate through pipes which shall heat rooms by radiation as is now done by steam-heating, over which system the new one will have manifest advantages; as, for instance, there will be no trouble caused by the water of condensation, which, besides the unpleasant noise it occasions in the pipes, is not unlikely to freeze and burst them, and at any rate entails a large outlay at the time of the installation in order to properly provide for its escape. It is also said that the cost of fuel for heating the air will be much less than for obtaining the same heating power from steam. Not only is hot air to be provided for heating dwellings, but also for cooking and for industrial purposes; for the system looks to providing hot air under such a pressure that fans and bellows may be dispensed with, and the consumption of fuel be materially diminished. This pressure will vary somewhat according to the points at which it is to be delivered, but will average about fifteen pounds to the square inch, while the degree of heat will average about six hundred degrees Fahrenheit.

THE FOUNDATIONS OF TRINITY CHURCH, BOSTON.

WE extract from the Description of the Church,[1] by Mr. H. H. Richardson, architect, the following passages relating to the foundations of the tower, and referred to in our Summary for this week.

"On testing the ground at the site a compact stratum was found, overlaid by a quantity of alluvium, upon which a mass of gravel, about thirty feet deep, had been filled in. Upon such a foundation was to be built a structure, the main feature of which consisted in a tower weighing nearly nineteen million pounds, and supported on four piers. The first pile was driven April 21, 1873. Every pile was watched, numbered, its place marked on a plan at a large scale, and a record made of the weight of the hammer with which it was driven, the distance that the pile sank at the last three blows, and the height from which the hammer fell. With these indications, a map of the bearing stratum was made, with contour lines showing the surface of the clay bed. . . .

"Under the centre of the church, a space ninety feet square had been reserved for the tower foundation; and this had been driven uniformly full of piles, as near together as practicable, over two thousand being contained within the area. This area, while the foundation walls for the other parts of the church were building, was subjected to various processes in preparation for its future duty.

"The piles within these limits were cut off at 'grade five,' six inches lower than the piles under the other portions of the building, as an excess of precaution against any failure of water for keeping the wood saturated. The ground was then excavated around the heads of the piles to a depth of two feet, and replaced with concrete. The concrete was mixed on the ground, put into barrows, and wheeled on plank ways laid on the heads of the piles to its destination, and thrown into the excavation. Four success-

[1] Consecration Services of Trinity Church, Boston, Feb. 9, 1877; with the Consecration Sermon by Rev. A. H. Vinton, D.D., an Historical Sermon by Rev. Phillips Brooks, and a Description of the Church Edifice by H. H. Richardson, Architect. Printed by Order of the Vestry.

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ive layers, each six inches thick, were put in, and each thoroughly compacted with wooden rammers. The upper surface of the concrete was kept one inch below the heads of the piles, on the theory that the piles being the true support of the structure, it was important that every stone should rest firmly upon them, without coming in contact with the concrete, which might some time sink by the settlement of the gravel filling, and cause dislocation of any masonry which might rest partly upon it and partly on the unyielding piles. The concrete, however, had an important use in preventing the lateral motion of the piles, and to some extent connecting them together.

"Before the close of this season, the first course of one of the four pyramids which form the foundation of the tower piers had been laid on the piles; and as an experiment the outside joints were cemented up, and the whole then grouted with cement and sand till the joints and the space between the stone and concrete were flushed full. The pumping, which had been constantly kept up to free the excavation from the water which came in through the gravelly bottom, then ceased, and the water was allowed to enter the cavity, which it soon filled to the depth of about four feet, and the operations on the ground were suspended until the following spring. . . .

"On resuming operations in the spring of 1874, it was found that the tide water, coming in through the gravel, had affected the setting of the cement. The concrete was in a favorable condition; but the grouting of the masonry which had been started for the pier was still very soft, although made with a cement which under ordinary circumstances sets rapidly. In view of this unexplained difficulty, as well as the need of being able to proceed rapidly with the piers, without being obliged to wait for the setting of any doubtful cement, it was thought best to reduce the matter to certainty by using Portland cement throughout the piers. A variety of English and French Portland cements was tried, but the result seemed equally good with all, some difference in the rapidity of setting being the principal variation. The stones already set were taken up and relaid and with the substitution of the different cement, treated as before; the outer joints being packed close, and the inside grouted until completely full.

"At first the Portland cement was handled like Rosendale in similar circumstances, the cement being mixed rather dry, and after being put into the joints with trowels, compressed as much as possible with rammers; but further experience and careful trials showed equally good results by first filling the larger joints with a trowel and the dryer mortar, and then mixing some rather rich cement, sufficiently liquid to pour into the smaller joints from a bucket, stirring it well with the thicker portion until the whole was of a medium consistency, and had penetrated every interstice of the stone-work. Each course was levelled up to a uniform surface with cement and chips where necessary, before the next course was begun; and the upper bed of the third course from the top, and all the vertical and horizontal joints of the two upper courses, were taken out of wind and pointed, so as to form a perfectly close joint.

"Toward the close of 1874, the four pyramids of solid granite, each thirty-five feet square at the base, and seven feet square at the top, and seventeen feet high, were completed."

Upon these pyramids the four piers of the central tower were laid up with blocks of Westerly granite, each five feet by two and one-half and twenty inches high, with hammered vertical and horizontal joints set in cement, thus forming pillars five feet square.

CORRESPONDENCE.

STEAMSHIP WAREHOUSE. — CHURCH WORK.

NEW YORK.

IT is proposed to build a new freight-depot and landing-stage for outgoing and incoming cargoes at Pier 39, foot of Houston Street, North River. The work is to be done for the National Steamship Company; and in the arrangements for the receipt and delivery of freight the proposed building will certainly be unique, and promises to be a vast improvement over the methods now in vogue. The dock-buildings along the river-fronts of the metropolis would be worthy of a special article. Generally they are great sheds, built more with an eye to capacity and cheapness than to artistic appearance or substantial construction. With the wretched system of wooden piers and bulkheads for which the city is forced to pay annually enormous sums, it is not unnatural that flimsy wooden or sheet-iron structures should cover them; and the only wonder is that greater fires than those which do so frequently happen have not led to enormous losses of valuable freight stored temporarily in these dock-warehouses. In a few of the ferry-landings, particularly of the several ferries of the Union Ferry Company, some attempt has been made to secure presentable street and river fronts; but while these improvements are praiseworthy, there is a look of flimsiness and rusticity about the approaches which offends both the desire for honest construction and for the fitness of a building to its place and purpose. The French line of ocean steamships have also a long jointed freight-stage deserving of credit as something better than the ordinary run of rudely-built, angular pieces of clumsy carpentery which make a sail up and down either side of the island like a raid about the back yards of the city's rookeries. A liberal use of paint would do something to lighten up the dinginess; and a pruning process by the Dock Commissioners in compelling the demolition of many of the decayed structures which a vanished commerce has left fringing our city, would do much more to give New York a water-front to which her citizens might at least point with feelings other than shame.

The National Steamship Company's agent, Mr. Hurst, having determined upon the erection of a two storied freight-depot, was unfortunate at first in securing the services of an inexperienced designer to carry out his wishes. The pier is 580 x 75 feet over all; and allowing for gangway on either side, and the open space at the pier-head, the building proper was to be 555 x 71 feet. The pier substructure is new and the best of its kind. After several designs had been rejected by the dock engineers, Mr. A. B. Ogden, architect, and Albert F. Hill, civil engineer, were called in, and the present design prepared. The construction is to be of wood. The timbers of the sides rest upon a heavy wooden sill, and make a well-bolted pyramidal pillar 24 x 24 inches. The first story is 19 feet to the lower side of the upper floor-beams; the real working head-room is 16 feet, the remaining space being occupied by the chrome steel suspensory trusses, 27 in number, calculated for a load of 256 tons each, with a coefficient of 4. The clear span for these girders is 64 feet, and they are well secured by having the floor-beams strapped to them. They rest at the end upon curved bed-plates, allowing a slight motion or give, without which the structure would soon rack to pieces under the shock of colliding boats. The original designer proposed to support the upper story beams with 12-inch Georgia pine girders, strengthened by a 3-inch iron tie-rod, with a 3-foot depth at centre. What weight this construction would carry can be seen at a glance. The upper story of the shed is to be nine feet in the clear, the gravelled roof above supported on an ordinary Howe truss. The street-end of the building is of galvanized iron, measuring to the apex of the central pediment 52 feet. A 24-feet gateway will afford egress for the incoming freight, to the receipt of which the lower floor is to be entirely devoted. On either side of the gateway will be ports for the reception of foreign-bound freight. Upon being dumped from the truck, the cases, barrels, or parcels will be received upon an endless band, revolving over drums and rollers, and conveyed to the upper floor. Along the sides of the lower story great rolling doors will give access to the vessel's hatches, while the freight above will be delivered from strongly-constructed doors or shutters, which, when lowered, serve as delivering stages. The cost of the whole will reach nearly $80,000; and, should it answer the hopes of the owners, the other steamship companies may be expected soon to build similar buildings.

Mr. Arthur Crooks has just completed at Rosendale, N.Y., the Roman Catholic Church of St. Peter. It is 58 x 128 feet, with nave and clerestory in an arcade of windows. The interior finish is of wood, light and open, the aisle columns being eight inches square. To the apex of the roof the height is 52 feet. The exterior is of Colabaugh brick with Amherst stone finish and a sparing use of black brick; the windows are of stained glass. The whole interior is to be richly painted, and an altar-piece and reredos 32 feet long and 20 feet extreme height fairly blazes out in color. At the ends of the aisles are two chapels to St. Joseph and the Virgin Mary. On either side of the chancel are the priests' and boys' sacristies connected by a passage behind the reredos. Beside the church which seats 800, is a chapel 25 x 40 feet for minor celebrations. At the south-west corner of the front a tower and spire rise to 131 feet. The entrance is in the style of an open porch with timber-work resting on a brick base extending breast high. Near the church is a brick and stone residence for the clergy. The entire cost of the church, residence and all, was $30,000, which compared with recent prices is a marvel of cheapness. The church stands in a most picturesque site, and is well spoken of by competent critics who have visited it. Mr. Crooks has just completed drawings for the Church of St. Mary to be erected at Wappinger's Falls near Poughkeepsie, N.Y.

Among other architects matters are dull. Several of the city churches are undergoing changes during the dull out-of-town season; notably St. Nicholas Roman Catholic Church which is to have a new sacristy, and Grace Church which is to be extended by Renwick and Sands by carrying the chancel back. Mr. Robertson, of Potter and Robertson, is designing an organ-case for the same building. Mr. Potter is preparing the scheme of six lectures which he will deliver during the coming winter before the students of Union College. The two lectures given by him last spring at the same institution were so well received, that considerable interest is felt in the promised series, the first three of which will treat of art and architecture generally, the fourth will take up Greek and Egyptian architecture, the fifth Roman and Romanesque, and the last Gothic and Renaissance art. The historical lectures will be carefully and fully illustrated with views.

PERSIA AND THE PARIS EXHIBITION. — The Shah has sent architects to Paris, who are to construct a building upon the Trocadéro, for the Persian collections, which are to be of great interest and importance.

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A SUBMERGED CITY.

THE Philadelphia *Press* quotes authority for the following story: Two divers who were seeking the valise of an American traveller that had sunk to the bottom of the Lake of Geneva, on the upsetting of a boat near the village of Saint Prex, not only recovered that article, but also found a superb Etruscan vase. Having reported that they found the bottom of the lake at that point broken and uneven, and that there were evident signs of ancient houses once inhabited by man, the municipal authorities of Saint Prex instituted an investigation. They covered the surface of the lake at the locality in question with oil, the effect of which is, as is well known, to render the water that it overspreads remarkably transparent. When the oil had extended over a considerable breadth of water, it was seen that the bottom of the lake was occupied by a town in a good state of preservation, the foundation of which goes back several centuries before the Christian era. Whole squares or islets of houses were discovered, their roofs covered with a thick coat of glutinous mud. Through their slimy envelope, the houses had the appearance of being constructed of brick, with the famous vermilion cement which the Celts, the Cimbri, and the early Gauls made use of, and which is harder than the Roman cement even. The Vaudois Cantonal Council is about to make an appropriation for the construction of a great jetty that shall surround the submarine city, and facilitate its being drained out and connected with the shore. Many interesting discoveries are expected when this ancient lacustrine town is thoroughly explored, and the contents of its houses are made accessible.

NOTES AND CLIPPINGS.

OBITUARY. — Martin E. Thompson, a well-known architect, died July 3, near Elizabeth, N.J. From 1835 to 1855 he was the foremost American architect, as before his time all the principal buildings were designed by foreigners. He built the old City Hall in New York City, the First Presbyterian Church (Dr. Paxton's) on Fifth Avenue and Twelfth Street, the Arsenal at Central Park, the State Prison at Sing Sing, in 1833; he changed the Middle Dutch Church into the old post-office, and the Deaf and Dumb Institute in Columbia College. He also built the Hanover and Tradesmen's Banks, and a large number of fine stores.

ACCIDENTS. — The side wall of a building in course of erection at No. 540 Pearl Street, New York, fell Aug. 4, and two laborers were slightly injured.

An accident occurred at the Lucy Furnace Company's Works, at Pittsburg, Penn., on the morning of Aug. 3, which resulted in the death of two men and the injury of five others. Seven men were engaged in lining a furnace, and were working on a scaffold which was supported by ropes. These took fire from the furnace, and the scaffold fell, precipitating the men into the furnace. Julius Harding and Michael Cusick were taken out dead, and the five others were so badly burned that they are not expected to recover.

In addition to the accidents mentioned above, the past week has been marked by two disasters quite as painful in their nature as those at Brooklyn and Ashtabula. On Friday, Aug. 3, a cigar factory was burned at Cincinnati, O., causing the death of six persons, — three girls who were in the fourth story ready to begin work, and three men in the third story. Luckily most of the hands had not arrived, or the loss of life would have been greater, and the criminality of the builder and owner in having provided only one narrow staircase for such a building would have been more apparent. The second disaster took place on Saturday, Aug. 4, near Simcoe, Ont., where seventeen inmates of the poorhouse upon the Industrial Farm of Norfolk County were burned to death.

ACCIDENT IN A QUARRY. — Early Saturday morning, July 28, before the workmen arrived, a large portion of the ceiling of the blue marble quarry at West Rutland, Vt., belonging to the Rutland Marble Company, fell in. The sound caused by the fall was heard for miles, and persons in the vicinity thought an earthquake had occurred. It is estimated that fully five hundred tons of rock fell.

BRICK-MOULDERS' STRIKE. — The brick-moulders of Memphis, Tenn., are on a strike, demanding an advance of twenty-five cents per day on the wages which have been paid for the last six years. The demand was refused, and work in all the brickyards is stopped, causing an advance of thirty cents on brick.

A LARGE STEAM PUMP. — Messrs. Cramp and Sons have now completed, with the exception of the boilers, the immense steam pumping engine which is intended for the Frankford Water Works, Philadelphia. The entire machinery will be ready to go into operation by the 1st of October. This engine was built at the contract price of $46,000, and has a pumping capacity of 10,000,000 gallons per day. It is a double-cylinder engine, the smaller cylinder being 40 inches and the other 60 inches in diameter. The pumps are 21 inches in diameter, and five feet stroke. The Frankford reservoir has a capacity of 36,000,000 gallons, to which have been run a 30-inch pumping-main and 20-inch distributing-main. There will be three boilers, two of which will furnish steam for 500 horse-power. The third boiler will be held in reserve for emergencies.

DISTEMPER COLOR FOR WALLS. — Looking at the matter of wall decoration from a sanitary point of view, the *Lancet* says that distemper color can be applied over papers of almost any kind, and is especially adapted to covering up the rich flock papers that so often poison and encumber dining-rooms.

BRITISH STONE ANCHORS. — The Charleston, S.C., *Journal of Commerce* says, "There lie in the Stono River, near Church Flat, four stone anchors, which are supposed to have been cast there when the British first landed on Carolina soil. These anchors are square, and weigh about five hundred and ninety pounds each. An iron is run through the stone and riveted at the bottom, and at the top are fastened iron rings for the purpose of making them fast to a vessel. On the stones are cut the coat-of-arms of Great Britain. They are separated from each other not more than twenty-five feet."

ARCHÆOLOGICAL DISCOVERIES. — A few days ago some men were engaged in ploughing the side of a road near a farm owned by Mr. Fuller, about seven miles south of the city of Rockford, Ill., when they ploughed up some human skeletons. Upon this farm there are no less than sixty-six Indian mounds, some circular and some long. They are so arranged together as to form what military men say was once a good fort, and in primitive times must have made a good fortification against all foes and hostile tribes. The bones found are, evidently those of three different persons. There were six *femora* and six *scapulæ*. The skulls found denote broad, square, massive face; chin very prominent, teeth farther apart than usual to men of the present day, and were very broad, showing that the owners lived largely on meat. Near these bones no relics were found. On this same farm some years ago a very complete vase was found in good state of preservation, which is now in the possession of the Chicago Archæological Society. The Rockford Scientific Society intend to make further investigations on this farm.

THE UNIVERSITIES AND THE NON-CONFORMISTS. — The English Presbyterians propose to put up two churches at Oxford and Cambridge, to cost not less than £25,000. The Scotch churches are asked to help, on the ground that Scotch Presbyterian students are found in the two universities. There is also a suggestion of the erection of a Presbyterian college at Oxford.

HYGIEOPOLIS. — Dr. Richardson's City of Health at Courtland, near Worthing, will probably be begun in the autumn. The architect and the engineer are busily engaged on the plans; and the estimates will be shortly obtained for making the roads and parade, and for the pier and protected area for bathing.

SOCIAL SCIENCE CONGRESS. — The following questions are proposed for discussion at the coming congress at Aberdeen, Scotland: —

Health Department. — 1. What is the best mode of providing suitable accommodation for the laboring classes, and of utilizing open spaces in towns? 2. How can the sanitary condition of the population engaged in the coast-fisheries of Scotland and the United Kingdom be improved? 3. The present state of house accommodation in rural districts — can its evils be remedied?

Economy and Trade Department. — 1. What are the causes of the present general depression of trade all over the world? 2. What are the social effects of trade-unions, strikes, and lock-outs? 3. What are the results of the administration of the Poor Laws in Scotland as compared with those of other parts of the United Kingdom?

Art Department. — 1. What principles should govern the restoration of ancient buildings, or their preservation as memorials? 2. Is our modern system of art competition favorable or unfavorable to art progress? 3. How can art be best introduced into the houses of persons of limited income? Voluntary papers on other subjects may also be read.

ENGLAND AT THE PARIS EXHIBITION. — The House of Commons has voted an appropriation of £12,500 for the English exhibit at the Exhibition of 1878.

THE BOIS DE BOULOGNE, PARIS. — The Bois de Boulogne is to be enlarged by adding land between the entrance to the Bois and the fortifications of the city of Paris, at a cost of about $80,000.

SELF-APPRECIATION OF FRENCH ARTISTS. — The *Société Libre des Beaux-Arts* has with singular modesty issued as the subject of its prize essay the following: *Chercher depuis quelle époque l'art français est supérieur aux arts étrangers.*

SANITARY SCIENCE IN PARIS. — Paris is awakening to the necessity of more attention to sanitary science; and the Society of Public Medicine and Professional Hygiene, lately formed, is under the immediate direction and patronage of the most eminent men in all sorts of positions. The society is divided into six sections, which will study respectively all that relates to the influence of climate on health, epidemics, including police inspection and international hygiene, private hygiene, public hygiene, professional hygiene, and statistics.

THE ZODTCHY. — We stated some time ago that the Russian architectural journal, the *Zodtchy*, was to issue a supplement in French. This has been done, and the monthly number is now accompanied by a supplement of eight pages, which contains excerpts from the weekly numbers of all that is likely to be of interest to foreign subscribers.

A PORTUGUESE BRIDGE. — The new iron railway bridge over the river Douro near Porto crosses it with an arch of a single span which measures 160 mètres (520 feet) and has a rise of 42 mètres (136 feet 6 inches). It is crescent-shaped in form; that is, the extrados and the intrados, which are connected by struts in the form of St. Andrew's cross, are farthest apart at the crown.

A NUBIAN TEMPLE. — The Temple of Ypsambul, in Nubia, is cut out of a solid rock, and is of vast dimensions. In it are four colossal figures sixty-five feet high, twenty-five feet across the shoulders, with faces seven feet high, and ears about a yard long.

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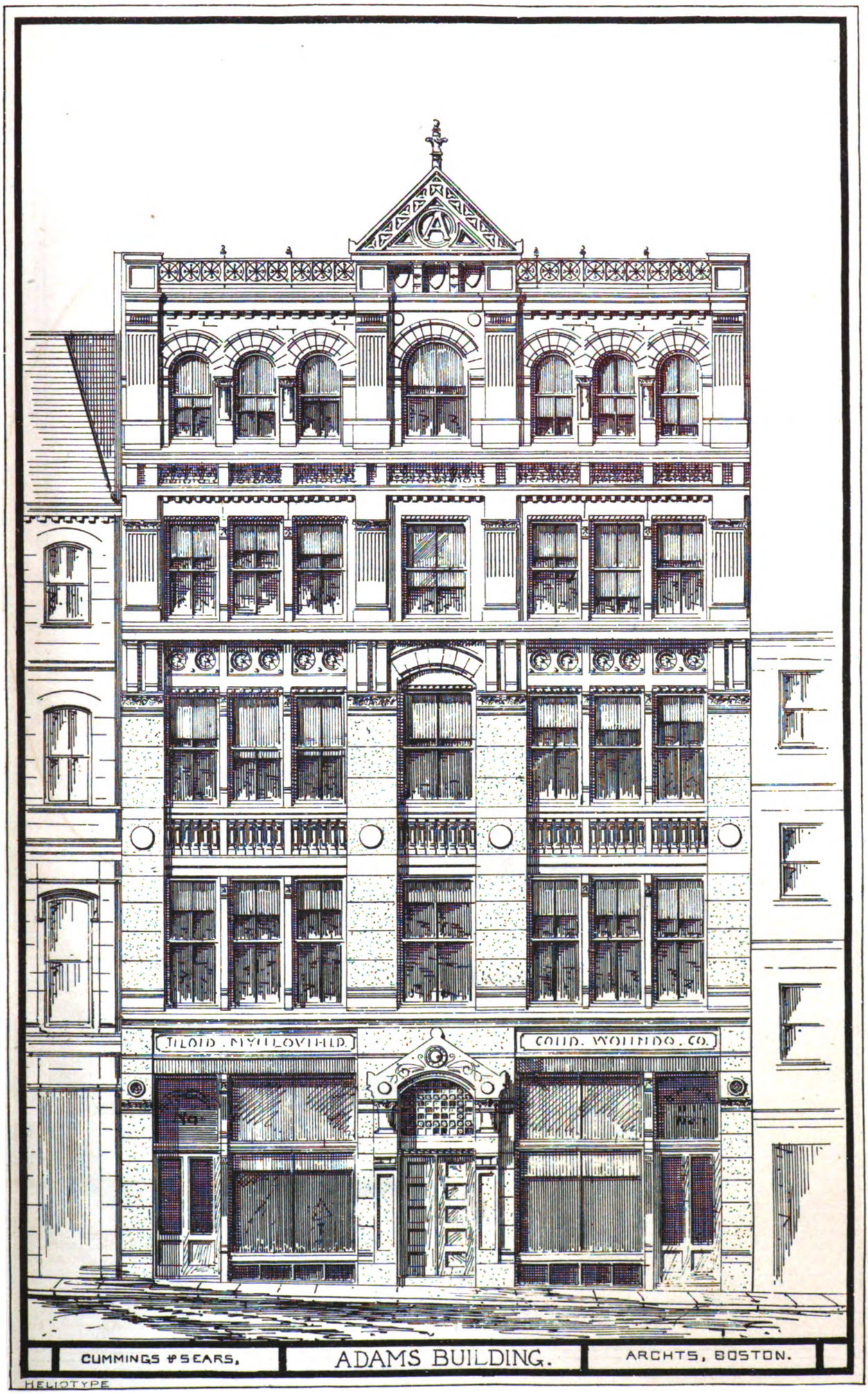

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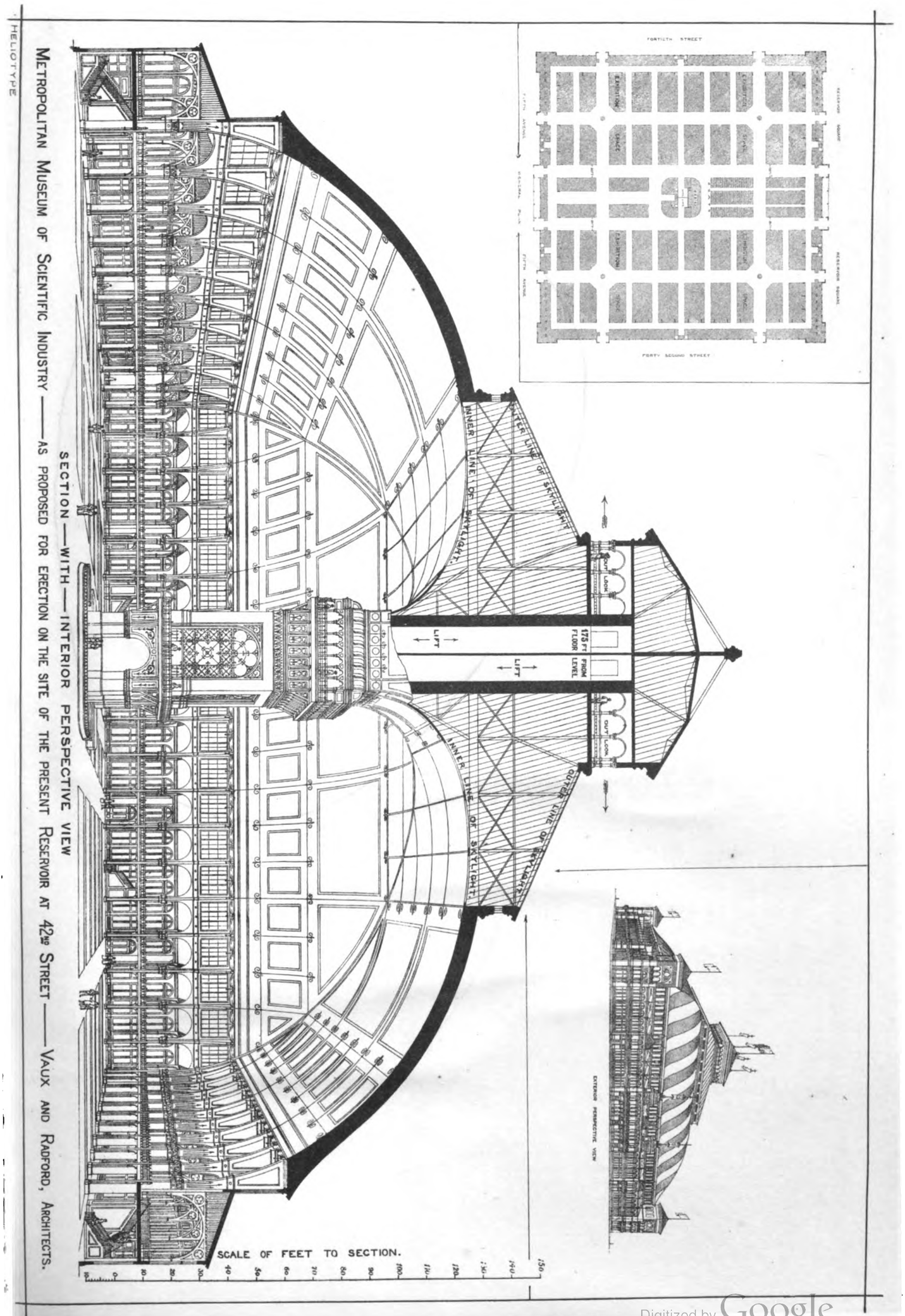

SECTION —WITH— INTERIOR PERSPECTIVE VIEW

METROPOLITAN MUSEUM OF SCIENTIFIC INDUSTRY —— AS PROPOSED FOR ERECTION ON THE SITE OF THE PRESENT RESERVOIR AT 42ND STREET —— VAUX AND RADFORD, ARCHITECTS.

HELIOTYPE

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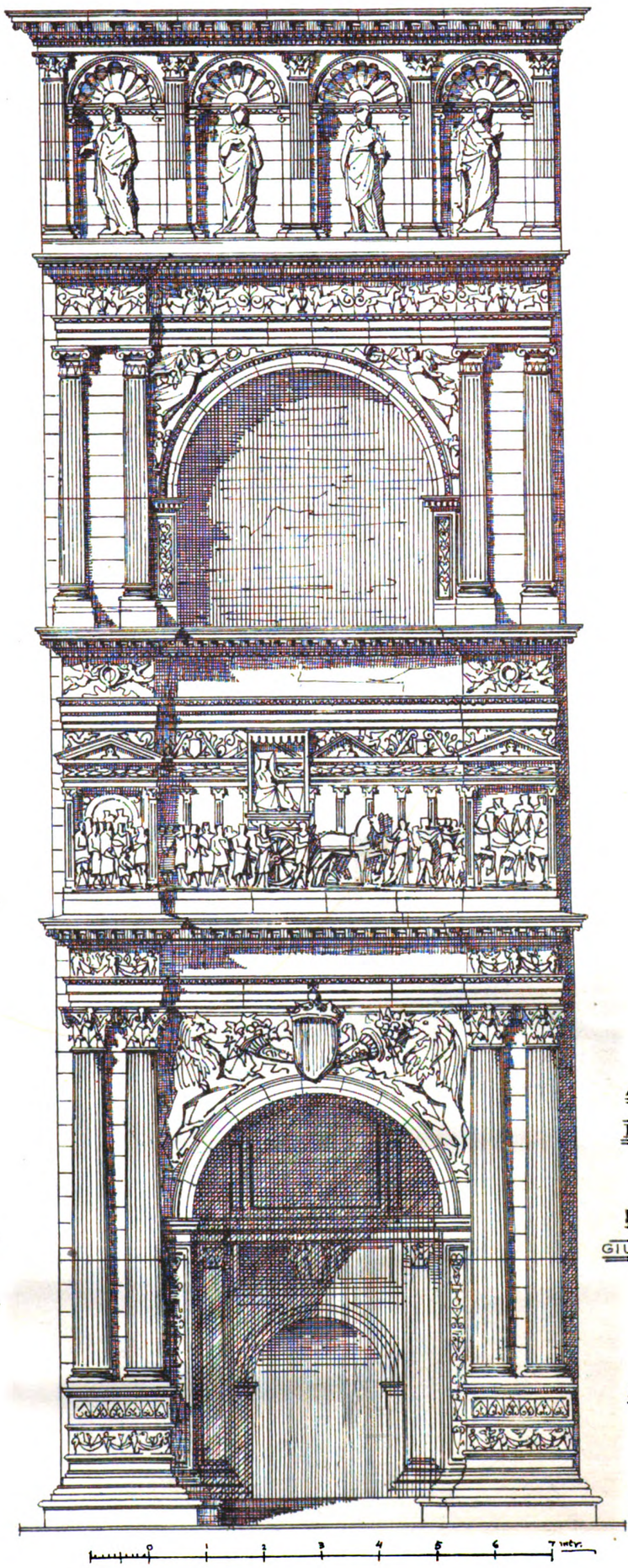

ARCH OF TRIUMPH
IN THE NEW CASTLE
AT NAPLES.

ERECTED 1470. A.D.
GIULIANO DA MAINO,
ARCHT.

AFTER A SKETCH
BY C. DOLLINGER.
ARCHITECT
STUTTGART.

HELIOTYPE

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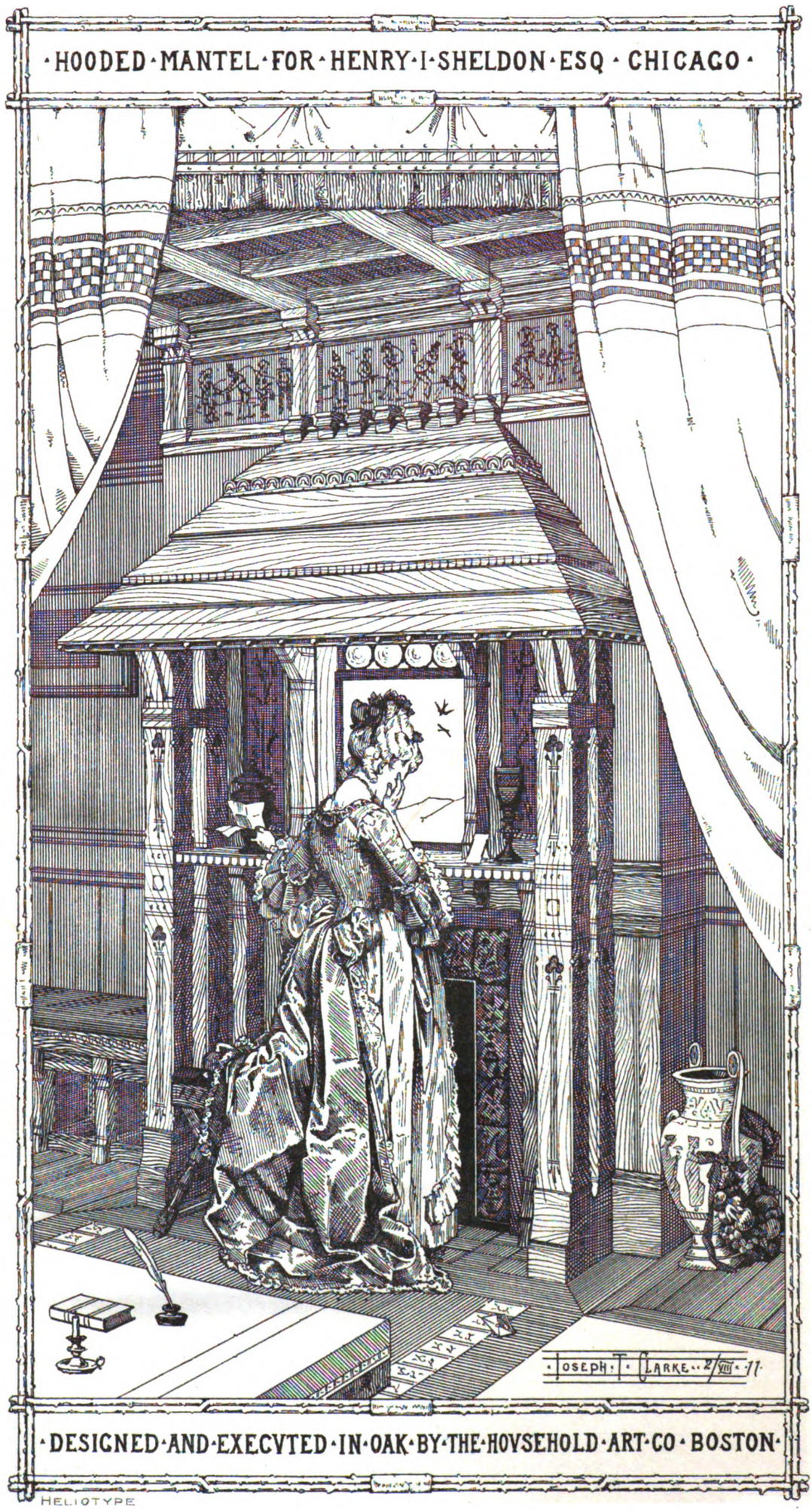

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, AUGUST 18, 1877.

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THE supplement to the Twenty-Second Annual Report of the Insurance Commissioners of Massachusetts states that out of 1,538 fires which have taken place during the past year within the limits of the State, and which have caused a loss or damage amounting to more than three and a half millions of dollars, 161 fires are attributed to "defective chimneys," and 127 to "exposures;" that is, in so many cases fire has been communicated from neighboring houses. Architects who are accustomed to provide against "defective chimneys" by such familiar precautions as requiring the flues to be built as straight as possible, to be plastered inside and out, allowing no wood-work within an inch and a half or two inches of the brick-work of the stack, requiring trimmer arches for hearths in every case, etc., and who find that most careful inspection is necessary to the proper carrying out even of these obvious preventives, have reason to be surprised that the proportion of loss attributable to this cause is not even greater than shown in this report. We venture to say that especially in the country towns, it is exceptional to find a house in which some of these simple precautions are not carelessly neglected. Chimneys are built upon poor foundations, or upon none at all; furrings are secured to the brickwork of flues, timbers are set into or against them, poor mortar and soft bricks are used, trimmer arches are omitted, and no secure backing put behind the facings of the fireplace to prevent dangerous communication with the wood furrings of the chimney-breast above. It remains a mystery why fires do not oftener occur from neglect or ignorance in such matters as these. Irresponsible builders fail upon these points of common sense as often as upon the more difficult points of drainage and ventilation, in which failure must be anticipated as a matter of course in the absence of legal requirements. So far as regards danger from fires, the shifting rates of the insurance companies, which are so adjusted as to compel precautionary measures, and thus to secure a degree of immunity in manufactories and large towns, practically do not protect the underwriters in the large majority of cases. Notwithstanding the self-protective devices of the insurers, their system is not made operative in dwelling-houses, and the fact that poor construction in the most vulnerable point is the rule, and sound construction the exception, remains undisputed.

THE acts to procure the proper construction of buildings in large cities like Boston and New York are of course not applied to small towns and villages. In view of the facts which we have above noted, it becomes evident that not only the simple and easily-applied precautions against unsafe chimneys, but the common sanitary appliances of drainage, if they can be properly formulated, should be required by a law, the enforcement of which might be intrusted to the local authorities in each case. It would be inexpedient and impracticable to attempt to cover by such legislation more than the simplest and most primitive conditions of safety, at least in the beginning. We submit the proposition to the associations having in charge the interests of social science; they cannot take in hand a more vital subject than the procurement of such legislation, and we believe the legislatures themselves would be prompt to apply any practicable remedy for the prevailing insecurity and insalubrity of households. The evils can only be reached in this manner; and if the beginning of so great a reform is discreetly and temperately managed, if too much is not attempted now, this beginning may prove an entering wedge, by means of which, as sanitary science advances, the most remote villages may be made to enjoy some of the more palpable fruits of high civilization, viz., safety, health, and cleanliness.

WE are indebted to several architects in Chicago for copies of a printed circular largely distributed in sealed envelopes among members of the profession in that city; and to the end that the authors thereof may obtain a fitting recognition for their enterprise, we give them the benefit of such publicity as we can command:—

PRIVATE CIRCULAR.

We desire to enlist the architects of the city in the general introduction of our styles of fencing. To that end we propose that where they introduce any of our styles into their plans and specifications, we will give them the regular salesman's commission; viz., 20 per cent on the amount furnished under said specifications. By using our No. 3 or 7 around city residences, architects will add very much to the beauty of their buildings, and to the satisfaction of their patrons.

Yours respectfully,
CHICAGO FENCE WORKS,
418 W. Lake Street.

The article in question is, according to the accompanying prints, the most ordinary garden fence, and the invitation to introduce it is perhaps the most vulgar insult that could be offered to the profession. If the article thus advertised were the best and most desirable of its kind, its use, under the recommendation of architects, is of course practically prohibited by this low attempt at bribery. The British Institute of Architects very properly stigmatized a similar proposition a short time since, by a public warning to the profession to avoid the wares thus recommended, as something not to be touched without defilement. The position of the American Institute in such matters has been repeatedly and distinctly defined. Offers of a percentage of profit to architects are made so frequently by tradesmen and inventors that an injurious suspicion attaches itself to the practice of architecture in this country. We do not believe that this suspicion is justified by facts, and are apt to consider that such offers are made in ignorance rather than with the object of corrupting or demoralizing. Our own duties in the premises, however, are obvious. We shall continue to treat all offers of this kind which may come to our knowledge, as insults to the profession; and we trust that every architect who may be approached privately or publicly with similar invitations will repel them in such wise that they cannot be repeated elsewhere with the excuse of ignorance of professional practice.

IN another column we print a communication drawing attention to the few early colonial types of building yet remaining in this country, as suggesting starting-points from which might be developed a character of architecture more distinctively and properly national than that which now prevails. Our correspondent refers in especial to the colonial mansions in Boston, which we regret to say may be sought for in vain, unless perhaps some long-forgotten street at the North End retains here and there a remnant so shattered and degraded that it can serve no purpose as an inspiration, either to the archæologist however pious, or to the architect however imaginative. Cambridge, however, retains half a dozen examples; Portsmouth also is especially rich in fine old houses with panelled parlors, broad staircases, twisted balusters, broken pediments over the doorways, carved and tiled chimney pieces, and balustraded roofs. The back towns of Essex County have many ante-revolutionary houses, and Marblehead, among the rest, retains in its narrow, crooked lanes, a few venerable relics of the kind, for the late fire devastated only the modern section of the town, where the shoe-factories and tanneries were accumulated. The same is true of many other early-settled districts in the seaboard States from Maine to Virginia. These remains are now records of history; and, if they must be allowed to perish, we trust that the devout antiquary will thoroughly measure and draw them before they

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quite disappear. Certain districts we know have been carefully explored by architects whose sketch-books must be full of notes, the value of which is increasing with age. As these examples, practically, are inaccessible to most of us, we trust that some of these gentlemen may be induced to give us the results of their interesting investigations, either in a separate publication or in our own pages, which of course will gladly receive any contribution of the kind. We are pleased to announce, by the by, that Mr. Charles F. McKim of New York, whose researches among these antiquities are well known, will shortly forward to us drawings of three stone colonial houses. Our "antiquity," although not much to boast of, and extending back to times scarcely more remote than a century and a half ago, should be considered a precious inheritance, and, if rightly used, can scarcely fail to be of service to architectural design in aiding to confer upon it that sentiment of locality which, for obvious reasons, should be encouraged and cherished.

IT is worthy of remark, however, that the local sentiment — the local characteristic of style — is unconsciously developed, in spite of all our attempts to masquerade in Romanesque, Gothic, or Renaissance, in Dutch or Puritan disguises. The necessities of local materials and local laws, customs, and requirements, the value of land, the degree of economy to be observed, the influence of climate, — all these considerations tend legitimately to the establishment of local types, and render it more and more difficult, as in the progress of society these stipulations and limitations multiply, for the architect to assert his preconceived fancies. He may of course succeed in preserving his individuality, just as an author, although using the same language as another, may be recognized by his style. He may undertake to imitate in new work one of the colonial mansions, for example, of which Mr. Holly speaks; but a thousand considerations conspire to interfere, consciously or unconsciously, with his loyalty to the chosen type, unless he is willing to act merely as an antiquary and not as an architect. Under these circumstances some of the peculiar charm of the old work disappears in the new, and the new inevitably gathers to itself more or less of modern characteristics; and the results are an eclectic work belonging to the latter half of the nineteenth century, as is proper.

THE English *Building News* has an excellent editorial in its last number (July 27) entitled "A Plea for Eclecticism," in which an interesting attempt is made to prove that the old styles which have been revived in that country have succeeded only in proportion to their adaptation to modern needs, and that out of all the revivals "the survival of the fittest" constitutes the characteristic style of to-day. But we are willing to go farther than this. We believe that with all our intimate knowledge of the works of the past, and notwithstanding all our experimental revivals of old styles, the principal element in modern work, in this country especially, is modern, born of our new materials and of our new way of using old materials, of our new methods of workmanship, and of our new conditions of life, of our hygienic and mechanical discoveries, and of our restrictions to given areas in large cities. We cannot say, however, "Go to, now, let us make an American style of architecture," any more than we can say, "The language of Sir Philip Sidney seems to us purer than that of Macaulay, that of Chaucer is more picturesque than that of Shakspeare or Bacon. Let us therefore talk and write after the manner of the Arcadia or the Canterbury Tales, rather than continue to be guided by the more modern forms." In short, in selecting our style of architecture to suit our immediate conditions in any case, we are simply using our peculiar prerogative to choose out of a language which by accumulation has become vast in its resources, a form of expression which seems best adapted to our modern needs; but, whatever the source from which we borrow our expression, the essential characteristic of our work is modern, and it does not in reality differ so fundamentally from that of our neighbor who selects his form of expression from a precedent as far removed from our own choice as Gothic is removed from Renaissance, that the future New Zealander will attribute the two works to different eras: on the contrary, he will see that they both possess all the distinctive characteristics of that first of the great eclectic eras of architecture, the nineteenth century; he will see, moreover, that the work is not French or English, but American "from turret to foundation stone;" and, if he is an intelligent archæologist, he will be able perhaps to pronounce whether the minds which conceived the two monuments and the hands which built them were brought up according to the schools or traditions of New York, Chicago, or Boston. To direct attention, therefore, to this or that range of precedent as more likely than others to lead to the development of a style distinctively American, as our correspondent suggests, is, in our opinion, to misunderstand first, what constitutes a distinctive or representative style and how it grows; and second, what is the peculiar function of the modern architect: it certainly is not the manufacture of styles.

THE DESIGNING OF MONUMENTS.

IT is probable that no important nation, perhaps none at all, has been so unlucky in its monuments as the United States. We have built a great many of them, especially of late years, and with signal ill success. This is an unpalatable truth, which it may be useless to urge upon the public; but we have no doubt that it is a truth, and that most persons who have considered the matter will assent to it. But since we have probably by no means done building monuments, it is worth while to consider why they are no better, and what is the natural means of making them better.

The reason why they are no better is simply that they are designed by persons who are not fitted for such work; that is, who are not educated to it, and who are mostly amateurs. In fact, there is nothing, except perhaps the practice of medicine, to which amateurs are so ready to addict themselves as to designing. People who have a fondness for art are apt to take up this work with as little misgiving as old ladies do the physicking of their friends. The difference is that in difficult and critical cases the amateur doctors get frightened, and leave the field to the professionals; but amateur designers are inaccessible to fear, and will not withdraw if they can help it. To such amateurs monumental design offers peculiar temptations; for since it does not concern itself directly with either practical wants or structural exigencies, it is not hampered by the need of technical knowledge, which is a wholesome restraint upon amateur efforts in other directions.

Now there is nothing whose right to exist depends more entirely on its absolute excellence than a monument. A thing which is made for use may still be serviceable if it is not first-rate. Even an inferior picture or sculpture may be in demand to fill some inconspicuous corner which would be disagreeably bare without it. But a bad monument has not even that poor excuse for toleration: unless it is really good it is impertinent. There is no actual need of monuments. If a memorial only is wanted, it had better be something useful. The monument is as dependent on its beauty to justify its existence as a hot-house flower. It is more so, for even rarity or singularity does not excuse it. As soon as we feel it to be inferior it is an offence, and calls to be expunged, like bad color in a decoration. Nevertheless we all want monuments, and the desire for them deserves the more sympathy, in that we do not expect to get either use or profit from them. Then let us take extreme pains to have as good as we can.

There really is no work which calls for nicer training, or more special training, than monumental design. It not only requires a fine sense of proportion, of massing, and of the fitness of detail, but it requires knowledge. It is a hopeless task for any one who has not carefully educated himself in the knowledge of conventional form; by which we mean the decorative forms invented by man for structural masses, mouldings, and ornaments. Such forms are not mastered without a study of natural forms, yet natural forms do not suffice. Mere sensitiveness of eye is not enough, for consciously or unconsciously the eye is led astray or set at fault by the unaccustomed nature of the elements it assumes to control. Nor is knowledge of forms enough. Familiar as they may seem, they will not submit themselves to the handling of any one who has not mastered them by long practise. The truth is, that monumental work, as soon as it goes beyond a mere decorated stone or an isolated mass of sculpture, is architecture *par excellence*. That is to say,

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it is the shaping of building materials with a single eye to beauty of abstract form and expression. It may be on a large scale or on a small scale, but it is architecture pure and simple, — nothing but architecture, — and it is absolutely the only human work that is so. It is just the work to which the architect gives his most assiduous study, and which no one else studies as he does. He does much work of other kinds, necessary or incidental, — the planning, construction, and administration of his buildings, — but these are not architecture at all. The design, or the monumental part of the task, is his real and vital work: to learn to do it well costs him more labor than all the rest. All the rest may at convenience be delegated, and often is, but this cannot be. If it is, the man to whom it is delegated becomes the real architect.

Even painters and sculptors, whose art, being a study of form, is most nearly allied to architecture, do not succeed in designing monuments, because they do not make a special study of the kinds of form which it requires. The defined sense of proportion which is gained with an artist's knowledge would of course be a very great help in the study of architectural form, but it by no means supplies the place of it. The arts of design are not interchangeable in practice. An architect may, on his part, if he is a skilful draughtsman, sketch a group of figures or a mass of sculpture to suit his composition; but he would be extremely foolish to try to carry it out himself, or to refuse to change it at the instance of a practised sculptor. Even between painting and sculpture, dealing with the same form and perhaps with the same subject, the boundary is so firm that it cannot be transgressed from either side with impunity. Sculptors have tried to paint, and painters to model statues, by virtue of their own callings; but they have usually failed, perhaps always. It is not reasonable to expect that they should succeed better in architectural work, and they do not. The difficulty is illustrated by that which even a skilled draughtsman has in drawing subjects with which he is unfamiliar. If he is an architectural draughtsman, however able, and has not studied the figure, he need not hope to draw it well. And so, if a painter, unstudied in architecture, attempts to paint it, the architect sees at once that it is drawn by a person who is not familiar with it; and that whatever be the pictorial merit of the work, as architecture it is unsatisfactory. And if it is difficult for a painter or a sculptor to portray architectural work with success, it is *a fortiori* more difficult for him to design it. This difficulty is well understood among people of older experience in art than ours. French sculptors and painters, for instance, are on the whole better trained in form than American. But a French sculptor hardly thinks of designing so much as a pedestal without calling in the assistance of an architect; and for a painter or a sculptor to undertake the design of an important monument without such assistance, is unheard of.

Not only is the monumental element the really architectural one in all an architect's work, but the designing of pure monuments is the most exacting thing he has to do. In any ordinary building the expression of use or construction goes to make up the effect. Practical exigencies divide the attention with art. Picturesqueness of form and the roughness of the ordinary building materials take the attention more or less from detail, or even from niceties of proportion, and make many things pardonable which are not altogether satisfactory. But in a monument there are no such exemptions. There is nothing left to rest upon but beauty of proportion and of form, the choicest details, the nicest adjustment of them to the whole and to each other. From the boldest mass to the smallest detail every thing must show the mastery of a refined and skilful hand, or the thing is a failure. Hence the extreme difficulty of the work. Few architects succeed well in it, and other people do not succeed at all. We are very far from saying that to give all our monuments into the hands of architects would secure at once a crop of noble and beautiful ones; but it is the natural and necessary step towards it, for they are the only men who systematically train themselves to such work. The good monuments of our time and of all ages have been built by architects, — that is to say, by the men, under whatever name they wrought, who did the architectural work of their time. Members of other professions, engineers, sculptors or painters, might of course train themselves to it; but the result would be simply that they would become architects, and they would have to make it the study of their lives as architects do.

A WORD about the Washington Monument, on which we have expressed our mind freely, because it is the most important one that has ever been undertaken in our country, and one in which every American has an interest. It is one thing to suggest a way of completing it, to ask the consideration of that way with whatever others may come up: it is a very different thing to carry out a design, or to forestall the consideration of others. There can be no objection to any amateur — engineer, sculptor, or even editor — offering a suggestion: valuable ideas may be brought forward, and often are, by persons who are not trained to carry them out. All artists can testify to the value of such ideas. If amateurs choose to carry them out in private work, they have a right to do so, and run the risk of failure; but with public work the case is different. Again, for a difficult public work, in which a whole community is interested, it is important to have, not the suggestion which the first comers may offer, but the best that can be had; and this is to be secured either by carefully selecting the most capable and qualified person who can be found, and letting him study the work deliberately; or by collecting from suitable sources a large number of suggestions, and choosing the best among them. We are not informed whether the persons who have brought forward projects for the Washington Monument have limited themselves to submitting suggestions for consideration, or how far they have tried to be beforehand in urging the adoption of their projects. When there is question of a great public monument which is to stand conspicuous for ages, and to which the people of a whole nation are to contribute, it is not seemly that any person, architect or other, should be allowed to secure the adoption of his own scheme before others are considered. Certainly any amateur, be he sculptor, engineer, editor, or what not, who not only offers his idea, but assumes to urge the carrying it out in his own way, ignoring the judgment of a body of men of life-long training for this very duty, neither waiting to see what they have to offer, nor even invoking their assistance for the treatment of his own idea, affronts a risk which no one has a right to thrust upon the public, and shows an inconsiderateness that ought not to pass without protest; and if the authorities who have such a work in charge allow themselves to be persuaded by the first comer, or to impose their personal and momentary preferences on a whole nation without taking every pains to find out the best thing that can be done, they are guilty of neglect of a great public trust, and are likely to do irreparable mischief.

THE PORTAL OF THE OLD PALACE CHAPEL, DRESDEN.

(See illustration.)

IN Lübke's History of the Renaissance in Germany is a noteworthy passage making mention of the portal to a chapel formerly existing at Dresden. This chapel having been long destroyed when Lübke wrote, the portal lay neglected in some rubbish receptacle within the palace limits, and there seemed little hope of its ever seeing the light again. Knowing this, it was with feelings of irritation, as well as of interest, that I read his praise of it as "the most beautiful Renaissance doorway in North Germany."

On a recent visit to Dresden, however, irritation was changed to delight at finding that the portal had been rescued from entire destruction. Within the previous few months it had been set up again, and all who are interested may now test in person the praise bestowed by so cautious a critic as Lübke.

A short description of it will be new even to those who have most thoroughly studied European buildings; for it is more than fifty years since it was lost to view, and I think it has never been described in detail, the above curt notice in Lübke being the only criticism I have found on the subject. And in the future, too, the doorway may be unremarked by many, for it is like a new work of art, — its reputation all to make. It has been so long forgotten that it will not attract pilgrims just yet on its unassisted merits; and Dresden is supposed — somewhat incorrectly — to possess so little that is essential to architectural students that it will often be left on one side in their journeys.

I have said that it has very recently been brought again under the eyes of men. It is a pity that they do not see it more favorably placed. It now adjoins the Museum Johanneum, on the *Neumarkt*, and gives access to the courtyard of the royal stables. Apart from the sentiment of the thing, a worse position could scarcely have been found for it in all Dresden. It was originally built into a wide façade; and it now stands free between two high

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buildings, and opens, as I have said, into a passage-way between them. By this means its proportions are utterly spoiled, its attic appearing far too massive in comparison with the main structure. A further injury, greater than that caused by two centuries and a half of exposure to the weather and by half a century of neglect, has been wantonly inflicted upon it: as soon as it was set up in the place it now fills, the whole thing, stone portal as well as wooden door, was covered with several coats of whity-gray paint. The exquisitely delicate work has been almost ruined. One can still trace the artist's intentions, but his handiwork — the touch of chisel and knife — is entirely concealed.

I was fortunate enough to see the structure before the painting was completed: the door itself was still untouched by the brush. The wood, which appeared to be oak, was in excellent preservation. A few missing bits of the high-relief work had been just "restored." At my next visit the door had been doctored in its turn, and so thick was the paint that the grain of the wood had disappeared, and only by the sense of touch could one longer distinguish between wood and stone. I could see no reason to believe that such "protection" as the paint affords was needed by any part of the portal. The neighboring museum had just been painted, and a bad precedent seems thus to have been the only excuse for the desecration. Had the materials been so far injured that further exposure to the weather in an unpainted condition would have caused further damage, it would have been far better to place the structure under cover; to set it up where it need not pretend to be of use, but might be examined and studied at leisure. Its dimensions are such that it might easily have been thus disposed of.

The height of the portal[1] to the top of the cornice I should judge to be about eighteen feet, and its greatest width nearly the same. The attic adds about six feet to the elevation, and is in turn surmounted by three statues about four feet in height. The finest work is shown in the portal itself; the door being less beautiful, and the attic far inferior to either.

Let us begin with the best, the main structure. Four fluted Corinthian columns support a rich entablature; two on either side of the round-headed arch that forms the actual doorway. There is no continuous stylobate. It is broken into a separate pedestal beneath each column, the two pedestals on either side standing together on a plain, low plinth. Between each pair of columns are two niches, one above the other, containing statues of somewhat more than half-life size. The centre arch rises from broad flat imposts, and is joined to the overhanging entablature that stretches above it, by a heavy conventional keystone.

The attic has pilasters corresponding to the columns below, and a niched statue between each pair. An *alto-rilievo* occupies the centre die.

I have spoken of the door as somewhat wanting in beauty when compared with its stone framing. The execution is less delicate; but I had especial reference to the general design. Instead of being ornamented as an undivided surface the door is treated architecturally, broken up into a "composition" which, however good in plan and detail, is inappropriate enough as a door. We have panels at the bottom, then a projecting, bracketed stylobate bearing columns, with their entablature and attic, and in the centre a round arch. This last is filled by a beautiful bas-relief. The door is thus a reproduction in most of its parts of the design of the portal itself.

The very best stamp of early Renaissance is on the work, and is shown in the classic perfection of ornament, as well as in a certain surviving flavor of Gothic. I think it may certainly be said, after what Roman model our architect built in Saxony. The resemblance in the decorative work to that on the surviving fragments of the Forum of Nerva at Rome is too strong to be due merely to a general reminiscence of Roman ideas. The capitals are identical, and architrave and cornice very nearly if not precisely the same. The main difference is that the Nervan entablature is broken — as in the Arch of Constantine — into projections, and that the figure-sculpture of its frieze is replaced by arabesques in the German example. These are in high relief, marvellously graceful, and of faultless execution. The broad band of decoration forming the architrave of the arch is repeated on the archivolt and the sides of the door-jambs.

Thus far we have found graceful fancy and exquisite workmanship. When we turn to the statutes in the niches we find something more. They were once all labelled by references to the Bible, but the inscriptions have been almost entirely obliterated by the paint. Two are unmistakably St. John and St. Peter, one still shows the name of Hosea, and the fourth I should judge from his ragged garments to be the prophet Jeremiah. I know of no modern statue that for expression and character — anatomically I am not a critic — I should rank above the St. John. There is neither the grotesqueness of Gothic nor the unmeaning pseudo-classicism of most Renaissance work. It is as typically Christian as the best antiques are typically Greek; it condenses as visibly as they a whole religion and a whole system of culture. Finding the lovely head in any part of the world, deprived of any external means of identification, one would pronounce it St. John as unhesitatingly as the Juno Ludovisi would be known for Juno, or the Belvidere Apollo for Apollo.

The St. Peter is vigorous, nervous, characteristic, simple, impressive. The Hosea and Jeremiah are good, — much better than the supplementary statutes in the attic niches, one of which, I think, represents Samuel. The other, bearing the sword of faith, must be Abraham, as the still legible reference is to Romans iv. The sculptured pilasters of the attic are comparatively coarse and poor. The *alto-rilievo* in the centre panel, representing the scene after the resurrection, is full of action, but very ungracefully drawn. The angel is balancing on the edge of the open tomb, the covering slab of which is sliding down in front most inartistically; and a group of Roman soldiers are waving astonished arms, which at first view seem much too numerous and on closer examination seem ever to increase in awkwardness. The sleeping soldier beside the tomb would be good if he could be disassociated from his gesticulating companions. The workmanship is clever, the figures being in unusually high relief, those in the front plane being almost completely detached.

The three statues surmounting the attic — the Saviour and two saints — are ugly and commonplace, very different from the niched ones in style, and are probably seventeenth-century additions.

The relief on the door — I hardly know whether to call it high or low — represents the woman taken in adultery. The Saviour is in the act of writing on the ground. It is quiet and reserved in composition and good in execution. In curious juxtaposition we find just below it a little relief, showing the summit of a wave on which rides a mythical being, half man and half fish. Saxon escutcheons and lions' heads, with the dates of erection, are introduced into the supplementary decoration of the door.

Having said that not only the design of the portal but all its details are purely classical, it may be asked where I found the Gothic element I have spoken of. In the spirit of the whole — in the way the Roman details are applied to the Roman design, and furthermore in the statues where individual genius had freer play than in the purely architectural work. A Gothic impulse has guided the hand that was manipulating the most entirely classical materials.

Early Renaissance buildings, as has often been noted, show this Gothic spirit when all Gothic design and detail have vanished. They show it, for example, in that diversity of corresponding parts which is alien to the spirit of classicism, in an adaptation of the plan to irregularities of ground, situation and proposed use. These virtues, as we may certainly consider them, dropped out of later Renaissance work, and the fact that they did so explains much of the unpliable sameness which characterizes it.

Our portal shows this survival of Gothic diversity in many details which do not strike the casual eye. The bas-relief of the frieze is a beautiful scroll-work of a sort of acanthus pattern starting from a central mask and enlivened by grotesques. There is on either side, near the centre, a human half-figure, then farther along on one side a conventional bird, and balancing it on the other side a winged lion. Then come toward either end three rosettes as pegs for the scrolls. Of this five are flower-like, but one is a lion's head. The corners are held by eagles alike in design. A more excellent study for an architect to-day than is offered by this exquisite frieze it would be hard to find. It is so perfectly balanced, so uniform in general effect, as not to jar with the most strictly classical design, and yet it is as free and untrammelled as Gothic decoration. It is, in my opinion, quite unsurpassed by any Renaissance work in any country.

Looking further we find that there are similar variations in the work around the arch, and that the pedestal below each of the four columns shows a bas-relief of different design, two bearing arabesques and two varying groups of *putti*. Both the door and the attic have more of sameness in their decoration than the portal proper, and are by just so much more commonplace and less artistic.

We see the Gothic influence finally, in the proportions of the four beautiful columns so strictly classical in detail and application. The shafts of these columns are but six diameters in height, while Greek Corinthian shafts are often ten diameters, and Roman (as at Nismes) eight and a half. The diminution of the Dresden shafts is one-eighth of a diameter, as nearly as I can measure it on my photograph. Curiously enough these anti-classical proportions call to mind not those of the later Gothic that had just expired, but of early Gothic work. The Romanesque architect, imitating the antique models that had come down through centuries when the builder's art was as good as dead, made his columns heavier and shorter than their prototypes. Gradually, as Gothic art developed in its own way, the original classic ideas were utterly transformed. Little trace of Greek or of Roman columns remained in the tapering, clustered, attenuated lines of late Gothic shafting. But when the Renaissance architect cast all this aside and turned his eyes back again to the classic examples, already once copied by his Romanesque predecessor, he treated them as that ancestor had done, shortening and broadening the shafts. And the curious parallel is completed when we see later Renaissance, like later Gothic, growing slender and tall in comparison with its earlier forms.

It remains now to make a guess as to who and what our architect was. If not his personality, it would be interesting to discover at least his nationality. Was he Italian or German?

[1] These and all following measurements have been made by the eye, but are, I think, approximately correct.

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I have said that the date of the portal is 1555–56; exactly that of the Otto Heinrich wing of Heidelberg castle, often cited as the earliest important Renaissance work in Germany. So we see that the Renaissance in the North was almost a century later than in the South; for the *Certosa* at Pavia, which fills in Italy the place claimed for Otto Heinrich's structure in Germany, was built in 1473. In Italy, by 1560, Michel Angelo had finished building; pure Renaissance was filling a grave beside the grave of Gothic; and post-Renaissance — *baroque* — architecture was beginning its career. Therefore both the purity of style and the Gothic tinge of our portal would have been less, I conceive, had it been, as I have heard it conjectured, of unmixed Italian origin. And yet contemporary works of unmixed German origin show far less real classic designing and far less technical perfection of workmanship than the Dresden doorway.

Von Racknitz, whose clever little monograph[1] was published about a hundred years ago, says that the Elector Moritz (1541–1553) was the first who brought foreign architects to Dresden. But though thus appreciating foreign talent, he confided his greatest works to a native artist, Hans Dehn von Rothenfelser. It may perhaps be a misnomer to call an artist *great* whose fame remains so purely local as his; but great he is in the estimation of Saxon antiquaries, and so we must consider him in comparison with his contemporaries. He built the well-proportioned, finely roofed, though unornamented hunting lodge at Moritzburg, near Dresden; and among other things in the capital itself, the two beautiful spiral staircase turrets in the courtyard of the palace are due to him. Elaborate in arabesques and tiny decorative bas-reliefs, these come nearer in execution to our portal than any thing in the neighborhood. But in conception and motive they are far more German, show far less purely classical inspiration.

Count zu Lynar was, says Von Racknitz, a prime favorite with the next Elector, Moritz, who put up the portal to his brother's chapel. Lynar is noticed as a working architect as well as an amateur, but I have not been able to obtain photographs of any thing attributed to him in the provinces. In Dresden itself there is nothing so attributed. He "was born in Italy, and brought *the better* style with him to Saxony," says our chronicler. "He had the greatest influence on the *building-desire*" — to translate literally the quaint old German word — "of the Elector, as well as on architectural taste in general."

I am making but an unsupported guess when I say that it looks to me as if Dehn had built the doorway under the instruction of Lynar, guided perhaps by drawings and plans and details brought by the latter directly from Italy, fresh from the classic fountain-head, unpolluted by the traditions of the Italian Renaissance already in decline, untinged by the ruder taste of the ordinary Renaissance of Germany. Viewing the exquisite workmanship I do not doubt that Italian carvers were employed upon it, imported for the purpose, as was done, it is well known, two centuries later, when flourished the luxuriant *baroque* architecture of Dresden.

The classic motives of the portal, we thus conclude, are so much truer, so much more elegantly treated, than in Dehn's palace-turrets, or in the work of other German architects of the time, that we cannot assign it exclusively to him. And yet if it had been of exclusively Italian origin, should we have had so strong a dash of individuality, so unmistakable a survival of of the Gothic spirit?

M. G. VAN RENSSELAER.

THE ILLUSTRATIONS.

PROPOSED ST. PAUL'S CHURCH, GLEN COVE, L. I. HENRY M. CONGDON, ARCHITECT.

(111 Broadway, New York, N.Y.)

THE site presents unusual difficulties, the ground sloping down from the cemetery on top of the hill to the village street below, presenting a steep grade. This feature rendered a basement Sabbath-school chapel a necessity, and it has been incorporated into the plan, and so managed as to add to instead of detracting from the effect of the design. The covered loggia at south transept protects the access to both floors through a staircase in the tower; while a carriage porch at the west end is of no doubtful utility, and spans the road leading to the cemetery above. The church will accommodate six hundred, and is intended to be built of native rock with freestone for cut-work.

PORTAL OF THE OLD PALACE CHAPEL AT DRESDEN.

See article under the above title.

BOOK-CASES. DESIGNED BY MESSRS. CLARKE AND DEWSON, ARCHITECTS.

(Studio Building, Boston, Mass.)

HOUSE-MOVING. — The *Architect* mentions as a noteworthy incident that a brick house at Colchester, measuring 30′ x 20′, had been safely moved a distance of ten feet!

[1] Geschichte der Künste in Sachsen.

THE SEWERAGE OF BOSTON.[1] — I.

WE have already noticed the general plan for the improved sewerage of Boston and its suburbs, which was proposed by the very able Commission — Messrs. Chesbrough, Lane, and Folsom — appointed by the city government.

The report now before us is a step toward the execution of the plan proposed by the commission, with some important modifications, but still in pursuance of the leading idea of the commission; which is, to collect all of the sewage of Boston and of much of the surrounding country, some sixty square miles, delivering it into deep water at a point at the outer end of Moon Island. It is in contemplation to accumulate the sewage in a reservoir, discharging it only during the first two hours of the ebb tide, under the supposition that it will be carried so far out to sea that it will not return to be deposited on the shores near the city.

Of the area to be drained about forty-six square miles lie above grade 40, and this may eventually be drained by gravitation; but it is intended that all of the sewage (except excessive storm water) from the twelve square miles lying below grade 40, and, for the present, the three square miles already sewered lying above grade 40, shall drain into a large intercepting sewer which at Tremont Street is to lie five feet below low water. This main sewer, beginning with a diameter of 6 feet, is to be, for most of its course, 9 x 11 feet. Its theoretical capacity for discharge (inclination 1 in 2,500) is about 235 cubic feet per second. For about a mile and a half, the course of the sewer — at its largest size — is through a tunnel driven at a depth of 100 feet or more below low water, about one-quarter of it through clay, and the remainder through rock, with a brick lining 12 inches thick. Near the end of this tunnel toward the city, there is fixed a pumping station, at which the whole mass of the sewage is to be raised by steam power to a height of 30 feet.

This whole scheme may well be called majestic, and the known skill of the engineers by whom it has been devised is a sufficient guaranty of its successful working. As a stupendous piece of engineering work, it challenges unqualified admiration. The question suggests itself, however, whether it is not somewhat too stupendous, and whether something very much less costly might not accomplish a result amply good for the needs of at least another generation. The city of Boston, struggling against the depressing effect of hard times, and with her capacity for the struggle weakened by the fire of 1872, should hardly have undertaken a work of which the preliminary estimate reaches nearly $4,000,000, without considering very carefully the extent of her present needs. It may very well be that the plan proposed is a wise one for early execution, but there is another side to the question which should be carefully studied.

By the plan under consideration it is proposed that a water-supply equal to 75 gallons per day for each inhabitant, and a rainfall of two-thirds this amount, from the whole of old Boston and from a large suburban area, shall at the outset be carried down to a point five feet below low water, then conveyed through a very large and costly conduit to a pumping-station, where it is to be lifted bodily to a height of 30 feet, then dropped to 100 feet below the bed of the harbor, carried on this grade a mile and a half farther, rising again to the high level and flowing in to an elevated reservoir.

It is safe to say that of the 75 gallons of water-supply *per capita*, not more than one-third will be so used for domestic or industrial purposes, as to be materially soiled. The other two-thirds might be delivered into the harbor or into the Charles River without the least objection — with absolute advantage. Nearly the whole rainfall, with only such attention to the cleansing of the streets as proper sanitary requirements would suggest in any case, might with as little objection flow directly into the harbor and river. In other words, four-fifths of the whole outflow for which this costly provision is proposed would perfectly well take care of itself, — would indeed be a valuable addition to the water about the city, — and the main intercepting sewer might be reduced from a capacity of 235 cubic feet per second to a capacity of less than 50 cubic feet per second. Then, again, the whole area at present sewered is only 6.7 square miles, while the area provided for — looking to a population of 600,000 — is 15 square miles. Therefore, for *present* needs, a discharging capacity of 25 cubic feet per second would relieve the city of all its offensive sewage.

Most of the efforts thus far made to apply the sewage of towns to the fertilizing of agricultural lands have proved pecuniary failures. But these efforts have thus far, in most cases, been applied to the treatment of the dilute effluent of sewers arranged to carry the whole water supply and a heavy rainfall. The successful recent experiments below Paris, — treating only foul sewage, — the rainfall, water from fountains, etc., being sent directly into the Seine, indicate that it is chiefly the unnecessary dilution of sewage which makes it unprofitable for agricultural use.

Whatever may have been thus far the success or failure of these attempts, the broad fact that no people can afford to throw its fertilizing refuse forever into the sea is obvious; and it behooves us to continue our experiments until we have found some means for turning it to good account. There is nothing in the average experience, even of England, which makes it seem at all impossi-

[1] Report of the Joint Special Committee on Improved Sewerage, July, 1877

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ble that if we can exclude the unsoiled water from the sewage of Boston, we may turn its fouler outflow to profitable use. The discharge being reduced to fifty cubic feet per second (double the present requirement), there would be no insurmountable difficulty in conveying it to remote agricultural lands along the South Shore.

The experiments made with floats to determine the course of sewage to be delivered off Moon Island by no means indicate that its silt would not be deposited in such a way as to foul the shores, or so to affect the channels as to give a very different direction to its future course. Our condition is very different from that of a city lying at the mouth of a great river whose flow is always at work in overcoming the balance of the tides. Solid matters are liable at all times to be driven back on our shores by easterly storms. On this subject Dr. Hackett Derby says, —

"The experiments with floats recently made under the orders of the Sewage Commission show that floats launched at Castle Island, in the main channel at high water, met the next flood tide near the Graves, and that they were carried back and deposited by it on the flats around Apple Island. From these experiments it may safely be inferred that the sewage of the city, delivered as these Commissioners propose at an average time of an hour and a quarter later than these floats were launched, must meet the flood tide between George's Island and the Graves, and be carried back by that flood and deposited on the shoals around or above the city. Admiral Davis observes that there is one principle of tidal deposit that should be distinctly enunciated, and that is that deposits on the ocean border are made only by the flood tide. The Admiral also asserts that the current of the flood tide in storms has at times lifted anchors and chains from wrecked ships, and carried them for miles in the direction of its drift. It may be inferred with confidence that no sewage which approaches the mouth of Boston Harbor four or five hours after high water will be received into the ocean. On the contrary, it will be returned to its shores or inlets, often accompanied by the sand which the flood tide bears with it."

There are other considerations affecting this question which we are compelled to withhold until our next issue.

CORRESPONDENCE.

CONCRETE AS A BUILDING MATERIAL. — A REMARKABLE HOUSE AT PORTCHESTER.

PORTCHESTER, WESTCHESTER CO., N.Y., July.

I HAVE had the privilege of examining the dwelling-house which has been building at this place during the past four years, and is now nearly completed. In the neighborhood of Glenville on the Byram River, are several factories deep down in the valley. One of these is the screw factory of the Russell, Birdsall, and Ward Manufacturing Company. On a commanding hill almost overhanging the stream, is the concrete house of Mr. William Ward.

The first impression is of a large square house with a long and rather low extension, having a large octagonal tower at the extremity of the main house, and a smaller square tower at the end of the extension. A wide veranda surrounds the large tower. On a nearer view, we see that the large tower is carried up as an observatory, for sight-seeing only, having a bold cornice in imitation of machicolations, and a flat roof with flagstaff in the centre. The other tower is to contain the water-tanks, one above the other, and has a plain cornice and hipped roof. This tower has very inappropriate sham windows, where no windows were required. The main house has two full stories up to the main cornice, which is bracketed with some reminiscence of Doric details, and another full story covered by a steep wall of the Mansard pattern, with bold hip rolls and crown moulding. Above this the main roof is hipped and visible.

The veranda, which surrounds nearly one-half of the house, is apparently a solid terrace up to the first floor, which is four feet above the level of the ground; the roof of it is supported on columns of the Roman Doric pattern. On the sides not covered by the veranda, the windows on the first and second stories have bracketed balconies with perforated balustrades. The part of the house called for convenience "the extension" has one straight story, and a mansard story covered by a visible hipped roof having considerable pitch. The treatment of it is plainer than that of the main part. The windows of the house are all surrounded by architraves, of square section, and without ornament; but the cornices and balconies are quite elaborate, considering the material of which they are constructed.

The outline of the house as seen from a distance is picturesque, and in harmony with the location and surrounding scenery. When we are not near enough to see the details, the general effect is good. The details are also by themselves good, but are incongruous and inharmonious. I mention these things particularly, not because the structure is one worthy of detailed criticism as a work of art, but because of the fact that an attempt has been made — and a successful one too, considered in its scientific aspects — to produce architectural effects never before attempted on such a scale, and with concrete all moulded and wrought *in position*, and not showing any joints.

The general effect of the building from a distance is a uniform bluish-gray color for walls and roofs, only relieved by the plate-glass windows and their borderings of yellow wood; for every window in this house is glazed with plate glass. To produce all this were used four thousand barrels of imported Portland cement, eight thousand barrels of sand, about twelve thousand barrels of machine-broken North River limestone, and an equal amount of white beach pebbles, besides other materials consisting mostly of the smallest and lightest forms of I-beams and ⅜-inch round iron rods.

It is needless to say that Mr. Ward is an enthusiast on Portland cement, but he is one of those whose enthusiasm is guided by sound reasoning and practical science. He has therefore not been led into the vagaries which so often beset those who, having but one idea, neglect important collateral matters while putting it into practice. Any one who visits this house expecting to find a vault-like structure, wherein the one idea of a house made in a solid block is predominant, will be disappointed. On the contrary, when he enters he will see hardly enough to remind him of the nature and construction of the building. He will see floors resembling single sheets of rubbed sandstone, hard-finished white walls, flat panelled ceilings moulded and enriched with moderation, and plaster cornices of good section and very tasteful ornamentation, while all the woodwork he sees or can find in the whole house is the necessary door and window finish in superb hard wood, of workmanship that would put to shame some of our best mechanics. Above the basement story there is scarcely any thing in the interior to remind one of concrete except the stairways and the kitchen fireplace. Yet there is not a lath or a wooden furring strip in the whole house, for every foot of plastering is laid on the solid concrete of the walls, partitions, and ceilings; and the ribs of every ceiling have their constructive purpose, as will presently be seen.

The architect is Mr. Robert Mook of New York. Mr. Ward assumed all the responsibilities of the construction. He set out with two resolves, — to test every thing thoroughly by actual experiment, and to have no contract work in his house. Throughout he has followed the system of Coignet, making the concrete very dry and ramming it thoroughly. In this there is nothing new; but he has employed as a dilutant of the paste a mixture of machine-broken stone and beach pebbles, and with remarkably good results.

The most interesting, and in fact the only novel treatment, is the construction of the floors. This is a combination of light rolled iron beams, small rods, and concrete; and, though the materials are nearly the same as those employed for floor construction in Paris, the method of using them is different, and the strength obtained results from other principles of construction. In the French system the main reliance is placed on the beams used: in this building the beams are strengthened by being surrounded by a body of concrete, and the filling between them is a homogeneous mass extending above the tops of the beams and to all four sides of the rooms. The floors are thus stiffened, not only in the direction of the beams, but in all directions. For this purpose a ledge is built out in the walls around each room to carry the outer edge of the concrete floor. The beams being stiffened by a surrounding mass of concrete, are very much smaller than those heretofore employed for floors of equal extent. Throughout the house "light" five, six, and seven inch I-beams have been used, and for the largest rooms "light" eight-inch beams. For instance, in the construction of the parlor floor, where no decorative effect is sought in the room beneath, he has used "light" eight-inch beams placed six feet from centres. The span is about 18 feet. A box is formed around each beam, and filled with concrete nearly to the top of the beam. Then a flat centring of rough boards is set between the beams, and a coat of cement put on about one inch thick. Then a course of ⅜-inch iron rods is laid on this concrete across the beams and a few inches apart, and another course of concrete one inch thick is laid over the rods. The next course of iron rods is then laid, crossing those in the first course. Then concrete is put on two or more inches in thickness, and the floor is built. It is about four inches thick between the beams. A second flooring is then laid of concrete, leaving arched spaces which are to serve as heating-flues, connected with the furnace and the hollow spaces in the walls. On this the finished floor of cement mixed with sand only is laid, trowelled off smooth, and after a time when hard and dry, is rubbed with stone and sand like polished sandstone. The rough board centring and boxes around the beams being removed, the under surface is ready for a coat of brown mortar which is hard finished in the usual way.

When the floor I have described had been laid one year, Mr. Ward piled a weight of 26 tons between the two central beams, and left it there through the winter. The apparatus he arranged for determining the amount of deflection showed only one hundredth of an inch. Before constructing any of the floors, he incased a six-inch "light" beam with concrete, and subjected it to a cross strain far beyond the limit of safe weight given in the published tables; and the result was a scarcely appreciable deflection. His object was rather to get practical results to satisfy himself as to the expediency of his plan of construction, than to formulate his experiments for future reference. His experiments on flat slabs of concrete supported on all sides also gave remarkable results.

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As will be readily seen, the beams as thus used are only accessory, but make the construction of large flat floors of concrete entirely practicable. They have the additional advantage also of being entirely protected by a fire-proof material. Mr. Ward was also struck with the remarkable adhesion of Portland cement to rolled iron, which was found to be nearly equal to its adhesion to stone, as proved by several experiments.

The ceilings of the first and second stories show deeply recessed panels, some quite elaborate in construction, as in his Elizabethan library on the second floor. In constructing these, I-beams were used, following the ribs and framed together so as to form a complete network over each room. Yet such light forms of iron were used, that in most cases the iron could hardly have been more than self-supporting. In some of the rooms not more than two beams extended from wall to wall, having bearings on the walls at both ends. Boxes were constructed around all the parts of this frame-work as in the first story, and filled with concrete thoroughly rammed in place and given good time to set. The interstices were filled with concrete and iron rods as in the first floor. All these ceilings are plastered and ornamented directly on the concrete. The mansard roofs are constructed of solid concrete; the ceiling over third story the same as the other floors. The roof is constructed like the floors, the beams being very far apart, fully ten feet in some places. Over each beam and each hip rafter in the roof a shrinkage joint is made, and this is covered with a moulded hip-roll, made in position but having felt between the roof and the roll. The panels of the roof between the hips and rolls are decorated on the outside with sgraffito work in cement of different colors. The cornice and main gutters are all made with the walls, but there are shrinkage joints between the roof and walls. There are also shrinkage joints in the rooms following the inside lines of the exterior walls where they cross the window recesses. Aside from these joints, the floor of each room is in a single piece; and not a crack was observed in the floors through the entire house. There are cracks however in the exterior, generally over the windows, and one large crack extends almost across the low part of the house called "the extension." This was said to be caused by a general contraction of the exterior; but it seemed to me as if it might be due to unequal settlement or spreading on the ground, perhaps to a failure of the base-courses, which were of rich concrete, to contract with the superstructure. These base-courses did not seem to be very wide for the superstructure with its great weight, especially as the house is built on hardpan and not on gravel.

The most remarkable examples of large pieces of concrete were seen in the floors and roofs of the large veranda; some of the sections between shrinkage joints being 30 feet in length by 12 feet in width, and not showing cracks after having been laid more than a year. The veranda columns are made hollow with spaces in the centre serving as leaders to carry off the roof water. The cylinders thus left are of solid concrete with a circle of the ⅜-inch iron rods in the centre, having bases and capitals cast on. The exterior walls are plastered with a cement in the proportion of two of sand to one of Portland, and rubbed down very smooth. The chimneys are bold in design and carried up high with hoods, all formed in one piece.

All the rain-water falling on the house is utilized. That from the high roof is carried down in tight cast-iron leaders which unite at the basement, where they are connected with a rising pipe to the lower one of the two tanks in the tower, forming an inverted siphon. The upper tank is filled with spring water by means of a windmill. The whole house is thus supplied with spring and rain water. The walls of the water-tower form the sides of the tanks, and the floors are constructed like the floors of the rooms. The tower thus far has proved to be impervious to water, and gives no indication on the exterior of what it is used for.

Another peculiar feature of this building is that the walls and floors are heated by a circulation from a hot-air furnace in the basement, to which the air returns after it has passed up through the spaces in the floors and walls. Beyond this no other means for heating are provided other than open fireplaces. The heating arrangements, which are somewhat similar to those employed in the Roman baths, have been in use two winters, and have kept the house effectually dry and warm during its construction. It is evident however that no supply of fresh air has been provided for, and consequently the most essential condition for effective ventilation is wanting.

The interior finish of the whole house is elegant and expensive, but not elaborate, and is an example of good workmanship such as is rarely seen. The stairway is of concrete with a newel-post of Mexican onyx and other marbles, while the balustrade and hand-rail are of wood. All the rooms are to be carpeted, using French nails with brass sockets inserted in the concrete floors. It was noticeable that no tiling had been used in the interior, where the finer qualities would have combined not only structurally, but harmoniously, with the other work.

The sanitary appliances (ventilation excepted) cooking and washing arrangements, and water supply, are remarkably perfect in every respect. Considered as a whole, the house is a scientific success, and should be an object of interest and study with every architect. As such, it will well repay any one who goes out of his way to see it; and your correspondent feels confident that though it is a private residence, any member of the profession who takes an interest in fire-proof construction will be as cordially received as was

YOUR CORRESPONDENT.

"THE AMERICAN STYLE."

NEW YORK, Aug. 6, 1877.

MR. EDITOR, — Would it not be well for us to consider if there is nothing in our country which might contain the germ of an American style of architecture, and if so, should it not be found and brought to light? England has, during the last half century, rummaged among its rusty ruins, and developed therefrom some of the loveliest examples of a purely English architecture, both ecclesiastical and domestic; and this has been the result of their feeling for archæology. Archæological veneration in this country may seem absurd; still it will be observed by the intelligent tourist, that our primitive settlers from nearly every nation stamped upon their buildings a distinctive type, and there are none more striking than those of the Dutch and Puritan. In some of our old cities, where progress has not obliterated the marks of these early times, numerous examples are left, which should be regarded and preserved by the architect with the utmost reverence. Take, for instance, some of the colonial mansions of Boston, which for so many years graced with ancient dignity the resting-place of Plymouth's sons. Many of these are now demolished, and millionnaires of modern standard have erected on their sites buildings whose pretension is only equalled by their assumption of foreign manners. It is true, our early buildings were constructed of materials which, in the course of years, must be repaired or entirely removed; but when we have an opportunity of designing a building to be erected on some ancient site, why not recognize the fact that the germ of a vernacular style was planted here two hundred years ago, and, instead of ruthlessly rooting it out, and substituting a Neo-Grec or Jacobean mansion, take the tender sapling from its withered trunk, and replant it in its parent soil, where, by nourishing it with the improvements which the fertility of science and art now furnish, it will develop to the present standard of excellence, and the restored mansion of three generations past will still seem at home, modernized and improved though it may be?

The town of Marblehead, which has recently been destroyed by fire, presents such an opportunity; but the chances are that that town, formerly replete with picturesque and primitive architecture, will be rebuilt with French roofs and modern shop-fronts, to the destruction of all its former sentiment.

If some of our architects would take up this matter, and study the primitive buildings of the locality before beginning their designs, much that is beautiful and original would be suggested, and the ablest efforts of the second century of the Republic would not result in the feeble copy of foreign styles of questionable fitness and in little sympathy with our institutions, but something distinctively American might be developed; yet most of us seem satisfied to introduce into old cities only the fashions of the day, regardless of the development of a national style.

In your issue of July 28, there are two designs, one intended for Albany and one for Newport (two of the oldest, and perhaps most interesting, cities in our country). Both are by architects of rare ability, and their efforts are praiseworthy in the extreme; but the opportunity which is here afforded to revive the good old types of Dutch and Puritan architecture has been wasted.

H. HUDSON HOLLY.

[See Summary.]

THE STATE BOARD OF HEALTH REPORT.

BOSTON, Aug. 8, 1877.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — In your generous notice of our Eighth Report, I would say in reference to the enclosed slip, — "Coming to us in this bald form, it suggests the query just how we are to go to work to see the sponge-holes seize albuminous matters by a kind of elective affinity; how we are to study their avid digestion; whether it is quite definitely known that the plant absorbs any putrescible matter before its decomposition. From an agriculturist's point of view, Dr. Carpenter seems to have been, 'on this occasion only,' somewhat enthusiastic," — that I went over the ground from the "agriculturist's point of view," on page 343 of the Seventh Report, and therefore did not think it necessary to repeat.

Very respectfully yours,

CHARLES F. FOLSOM.

STONE-CUTTERS' STRIKE AT QUEBEC. — All the stone-cutters on the new Parliament Buildings struck work Aug. 5. The contractors decided to pay twenty cents per foot, instead of a dollar and a half per day. The men demand forty cents, which they say is about equal to the present wages.

ELECTRIC LIGHTING. — It is thought to be almost certain that the exhibition building at Paris will be lighted by electricity.

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NOTES AND CLIPPINGS.

THE PLYMOUTH MONUMENT. — The statue of Faith, forty feet high, which is to crown the Pilgrims' Monument at Plymouth, Mass., has been placed on its pedestal. The figure, which faces the harbor, stands with one foot upon a rock, the leg a little advanced, the head having a slight inclination downward; one arm is at her side, holding an open Bible, the other lifted with the index finger pointing upward. In size and finish it is said to be one of the finest pieces of granite statuary in the world. The four seated figures for the buttresses, representing Morality, Law, Education, and Freedom, remain to be done, but work on them has not been begun, as all the money on hand has been spent on the crowning figure.

THE LOSSES AT ST. JOHN, N.B. — The losses of the American insurance companies through the fire at St. John, N.B., amount to $445,000. The English companies lose $4,822,000, and the Canadian companies lose $1,469,000, making a total loss of $6,736,000.

THE WOODRUFF EXPEDITION. — The fees for the students in the Woodruff scientific expedition around the world have been reduced from $3,000 to $2,500, and for the cadets to $2,000, and a larger vessel, the Ontario, has been secured; all this in consequence of the large number who have applied for passage. The cadets' uniform, costing $104, is to be furnished free of charge; and cadets are to occupy staterooms, and sit at the same table as the students.

ARCHÆOLOGICAL CONGRESS. — The State Archæological Association of Ohio will hold its second session at Cincinnati, Sept. 4 and 5. A number of prominent gentlemen have promised to be present and furnish papers on the occasion. The citizens of Cincinnati have arranged for excursions to localities of interest. The session is likely to be a profitable one. All who are interested in the study of the pre-historic antiquities are cordially invited to attend. Delegates will please report to Julius Dexter, at the Historical Rooms, Cincinnati College Building.

SOCIAL SCIENCE CONGRESS. — The next general meeting of the American Social Science Association will take place at Saratoga, beginning Oct. 4, and lasting through the week. At a special meeting on Friday, Oct. 7, reports from the Social Economy Department on "Economy in Building," and on "Home Comforts and Amusement at Small Cost," will be read and debated upon. During the session, papers on the "Ventilation and Warming of Schools," by D. F. Lincoln and William Watson of Boston, and by Frederic Winsor of Winchester, Mass., will also be read.

AN HONORABLE DISTINCTION. — We are pleased to learn that Col. Geo. E. Waring, Jr., of Newport, has been elected an honorary member of the Royal Institute of Engineers of the Netherlands; the reason assigned for this being Col. Waring's work upon the Centennial Reports upon the "Public Works of the Netherlands," and his chapters on Dutch Engineering, which appeared in "A Farmer's Vacation." This is no mean distinction, as this Institute is one of the first scientific bodies of Europe; and aside from the royal family and the high officials of the kingdom, the only other honorary members are, Fowler, inventor of the share-plough; De Lesseps, the projector of the Suez Canal; Des Noyere, Inspecteur-General des Ponts et Chausées; Dr. Hage of Hanover, and Charles Manly of London, both distinguished theoretical engineers.

THE CAPITOL AT DES MOINES. — The law authorizing the building of the Capitol states that "the cost thereof shall not exceed the sum of one million five hundred thousand dollars." At the present time $1,168,621.31 have been expended; therefore less than $400,000 can be legally expended, and yet the building is little more than half done.

THE OFFICIAL REPORTS ON THE CENTENNIAL EXHIBITION. — It is said that the official reports on last year's International Exhibition, some of which are already printed, will probably fill twenty large octavo volumes.

A MEMORIAL WINDOW. — A stained-glass window has just been erected in Christ Church, Houston, Tex., in memory of the first Protestant Episcopal bishop of Texas, the late Rev. Dr. George W. Freeman. The window represents the Last Supper.

THE LONDON OPERA-HOUSE. — It is said that work upon the big opera-house on the Thames Embankment, after some months of cessation, is to be resumed with increased activity, and that it will be covered in and the inside finished by next Lady's Day (March 25). The work already done has cost $300,000.

THE OPERA HOUSE, PARIS. — The façade of the Opera House has lately been cleansed and revivified; no easy task, because of its size and the variety in the material of its component parts. The stonework was washed, the bronze-work oiled, and the marble columns and panels restored to something of their original brilliancy of polish.

THE ST. GOTHARD TUNNEL. — The works for piercing the St. Gothard Tunnel, 15 kilomètres (9¼ miles) in length, are pushed forward without interruption. To the north, the entry is at the village of Goschenen, in the canton of Uri; to the south, at Airolo. From Lucerne to the Italian frontier, the railway will be 71 leagues long, and will cross the cantons of Lucerne, Zug, Schwytz, Uri, and Tecino. The whole line will cost $57,800,000, of which the piercing of the mountain will take $13,000,000. The tunnel is to have a double line of rails; it will be eight mètres wide and seven mètres high. About 2,000 workmen are constantly employed at the two ends. Six and a half kilomètres (four miles) have yet to be excavated. The operations commenced in 1872.

THE SIMPLON TUNNEL. — The preliminary surveys for the cutting of the Simplon tunnel and the construction of the approaches are in course of execution. The plans were finished in the Bureau of Lausanne. The line commencing at Brigue, which will serve as an international station at the entrance of the tunnel, has a length of 18,340 mètres(11¼ miles). The tunnel emerges at Isella, and the line advances from there to Bomo d'Assola. The total length of the line is estimated at 46,900 mètres. Near Bomo it joins the old ways, which continue the Italian lines to the station of Arona. As far as the village of Crevola the line runs along the left bank of the Boveria, but, arriving at this point, it crosses the river.

THE HUDSON RIVER TUNNEL. — It is the intention of the Tunnel Company to begin work early in the coming fall. A shaft 28 feet deep has been dug at the foot of Fifteenth Street, Jersey City, and this depth will be increased 20 feet. From this as a starting-point, the tunnel will proceed in a north-easterly direction under the Hudson River and the Christopher-street Ferry Slip. The entrance on the New York side will be in the neighborhood of Washington Square. From Jersey City the grade will descend two feet in every hundred feet, until a point 2,700 feet from the New York side is reached, when it will begin to ascend at the rate of one foot in every hundred feet. The tunnel will be two miles in length, with a road-bed 23 feet wide, with two separate tracks. Through its entire length it will be lighted by gas. The wall will be constructed of brick, with a thickness of four feet. At no point will the top of the tunnel be less than 35 feet below the surface of the water, and in many places it will be 70 feet below. One hundred and twenty laborers will be engaged in the construction of the tunnel. The work will go on during the whole of the twenty-four hours, the force working in three relays, for eight hours each. Although the tunnel will be used for the conveyance of passengers, its main object will be the transportation of freight to and from the great railroad lines which terminate in Jersey City. The capital of the company is $10,000,000.

A SOUTH AMERICAN TUNNEL. — The famous silver mines of Cerro de Pasaco have since their discovery yielded silver estimated at $500,000,000 in value. Their productive capacity is doubtless much greater, but it has never been possible to work them thoroughly because of the impossibility of keeping them clear of water. Mr. Henry Meiggs, the American engineer who has done so much for Peru by building her railroads, has proposed, and we believe the Government is likely to accept his proposition, to construct a tunnel for the purpose of draining them, similar to the Sutro tunnel which has been building for so many years for the purpose of draining the Cumstock lode in Nevada.

THE FUTURE OF THE ART TREASURES OF ITALY. — The *Academy* says that the Italian Senate proposes to enact that all important monuments in Italy, whether belonging to public bodies or private individuals, must be declared and catalogued within a period of two years, and that, if necessary, the Government shall take steps for their restoration. The destruction of any works of artistic or antiquarian interest possessing national value, and even the disposal or removal of them, without the permission of Government or of local authorities, are to be strictly prohibited. The act will also make it obligatory on private owners to make their art treasures accessible, if not to the public, at least to art students; and in the case of excavations to transmit to Government a weekly register of articles found, over which, if the discoveries should be important, the State will claim to exercise control.

A NEW AND PROBABLY A FRUITFUL FIELD FOR EXCAVATION. — The site of the ancient city of Sybaris, in Catania, Southern Italy, famous for its habits of luxury, is to be explored by the Italian Government. Excavations will begin during the coming autumn. Sybaris was destroyed by the Cretans about 510 B.C.

COMPRESSED GLASS. — In the Siemens' glass-works, at Dresden, there is now manufactured a product which has the same properties as La Bastie's tempered glass, the strength being communicated by the pressure of metallic rolls. Plates can be made, by this method, of much larger dimensions than by La Bastie's. They are beautiful to look at, and can be ornamented with the most complicated designs, at a less cost than ordinary glass. Siemens claims that glass manufactured by his process has a greater strength than tempered glass, in the ratio of 5 to 3. When broken it shows a fibrous structure, while La Bastie's is crystalline. For equal thickness the resistance of a plate of compressed glass is from seven to ten times as great as that of an ordinary plate. In trial experiments performed before the Berlin Polytechnic Society, a lead ball weighing 120 grammes was let fall from different heights upon plates arranged horizontally, and supported only at the four corners. While an ordinary plate was shivered by the weight falling from a height of three decimètres, the plate of compressed glass of like dimensions broke only when the weight was let fall from a height of three mètres, and even then only under the effect of many successive blows.

THE TOWER OF BAKON. — In the Russian Caucasus is the Tower of Bakon, the point of pilgrimage of the fire-worshippers from a period far beyond the era of Mohammedanism. The pilgrims are now few in number. The tower, which has no windows, is reached only by subterranean passages. It is an immense building, and is surrounded by a high wall, within which and encircling the tower are high columns of flame, which spring from the earth, and are fed by the naphtha that is found in large quantities in the surrounding soil of the mountains. These fires are kept perpetually burning.

SPECIMEN BRICKS. — At the request of a citizen of Constantinople a New Haven firm of builders have recently shipped to him a section of a brick wall, with information as to mixing the mortar used in laying it up.

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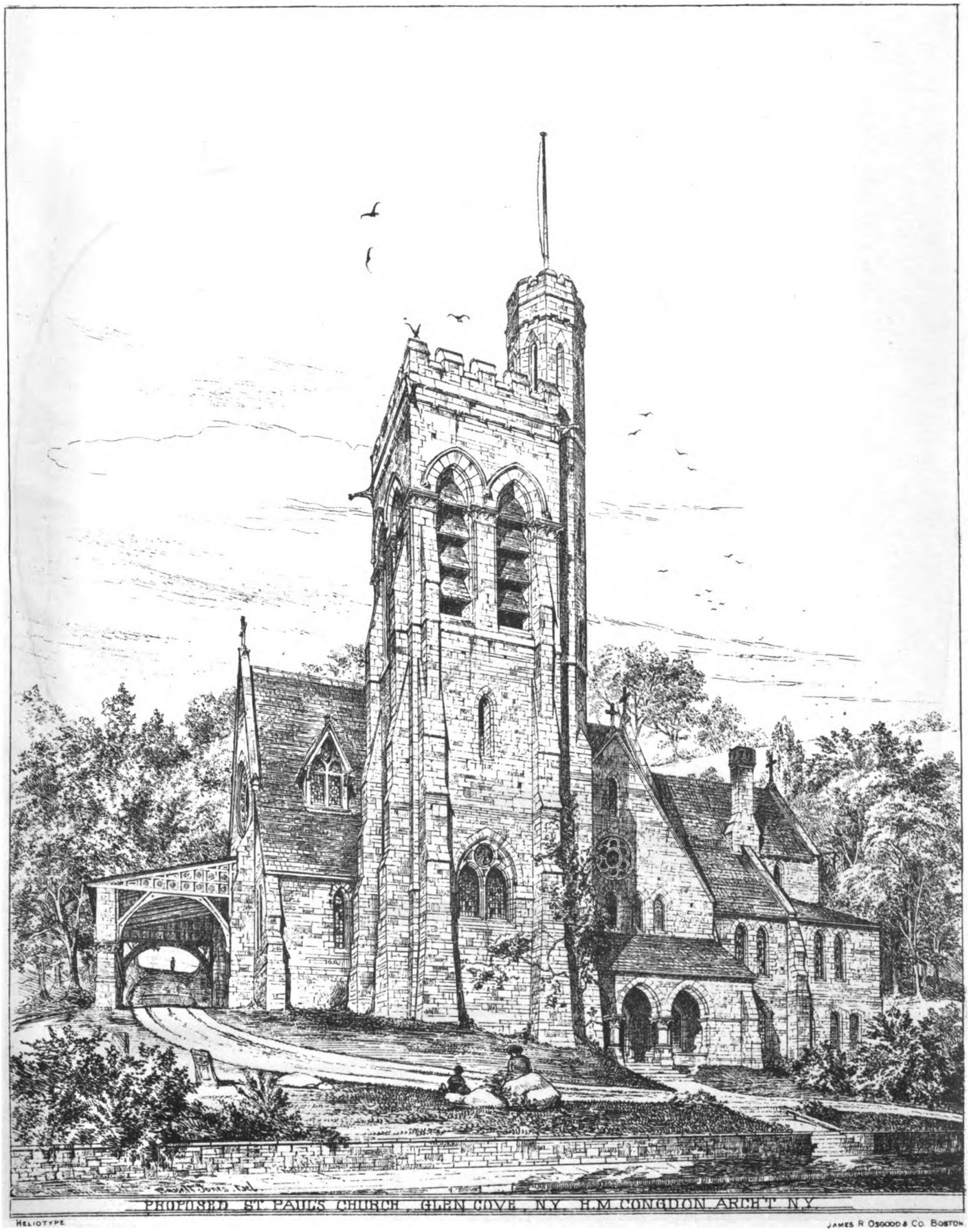

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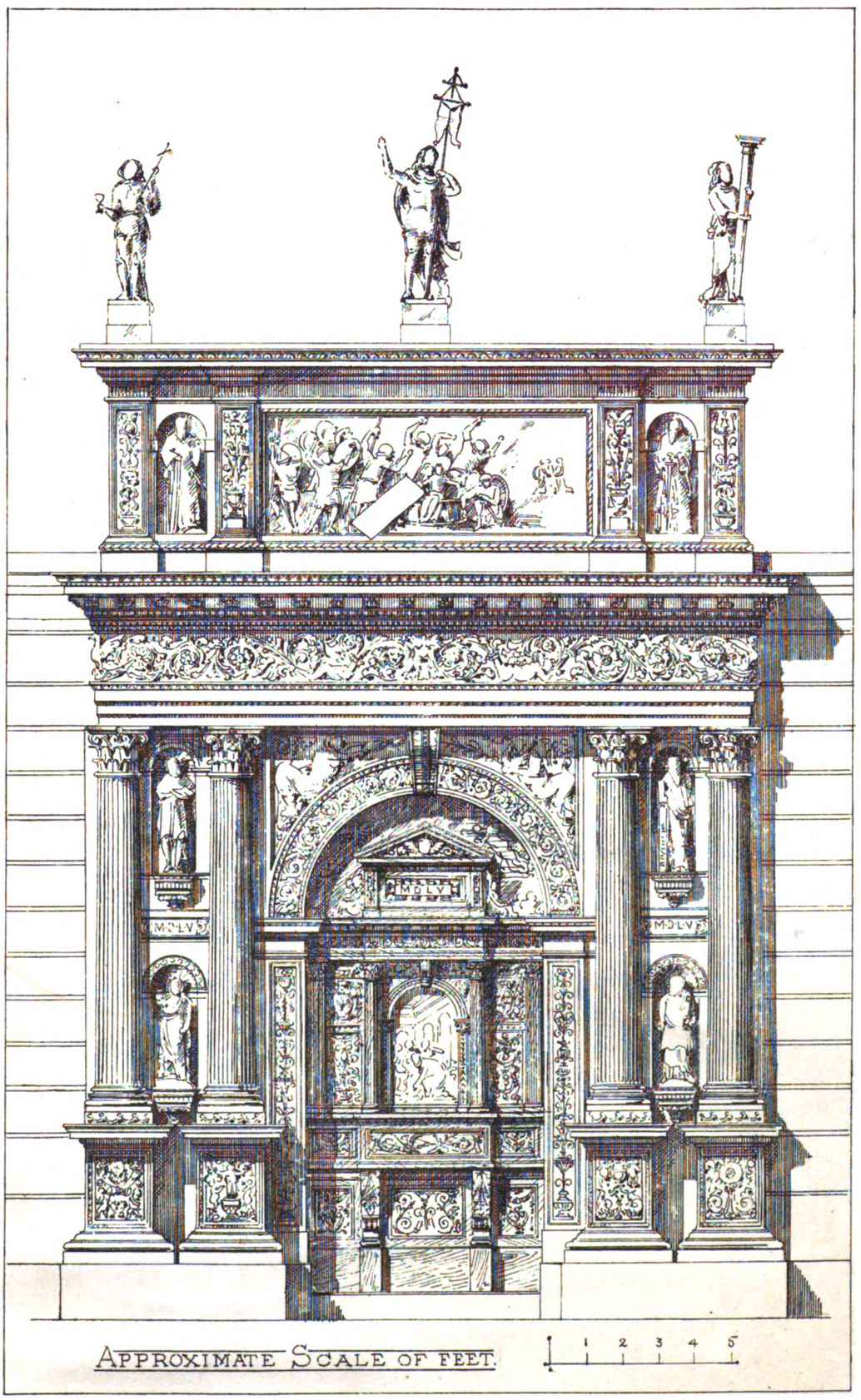

THE PORTAL OF THE OLD PALACE CHAPEL DRESDEN.

BUILT ABOUT 1555, DEMOLISHED IN 1834, REBUILT 1876.

FROM A PHOTOGRAPH. FM HOWE, DEL.

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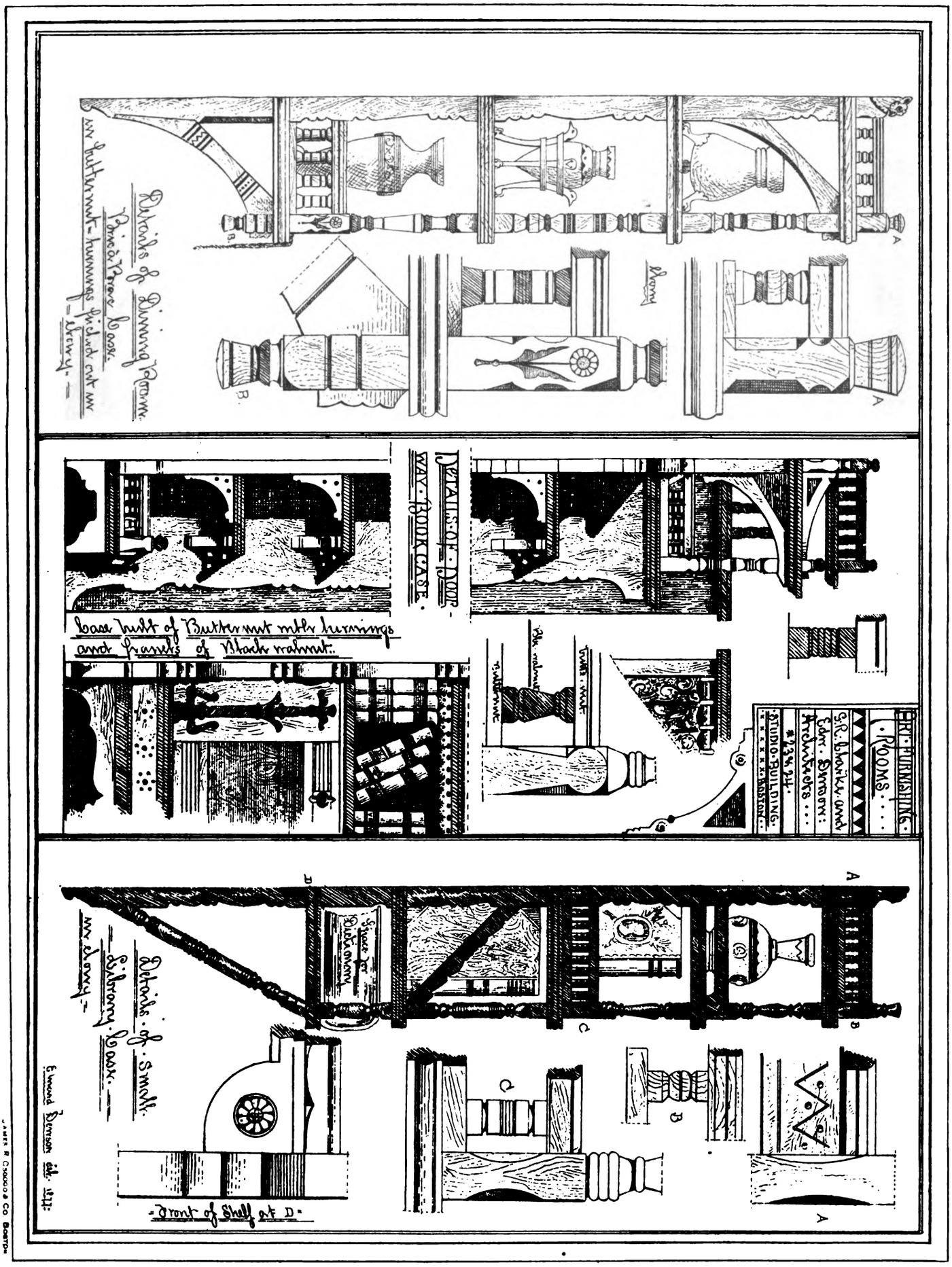

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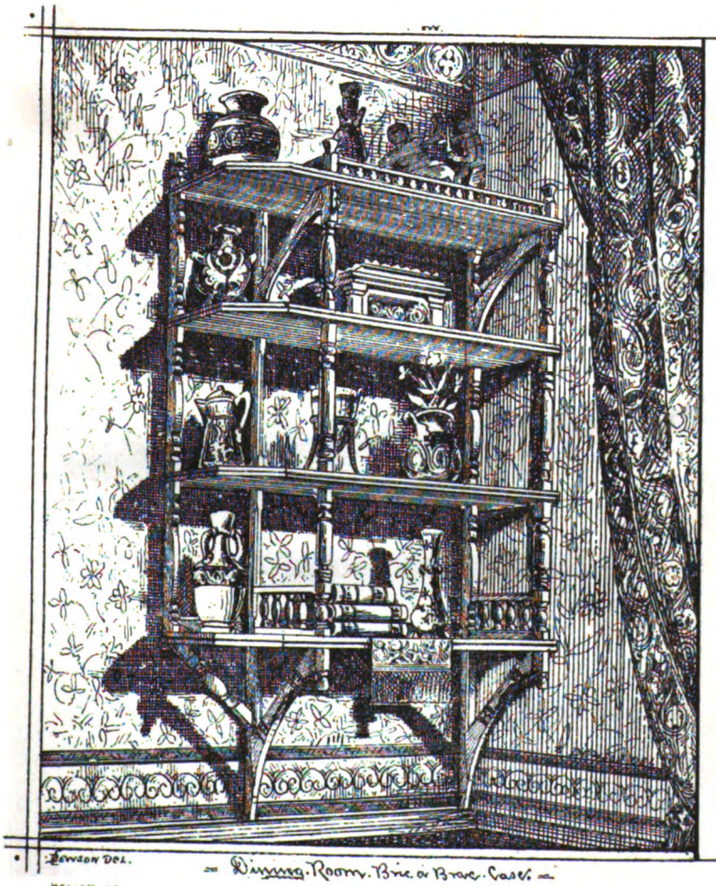
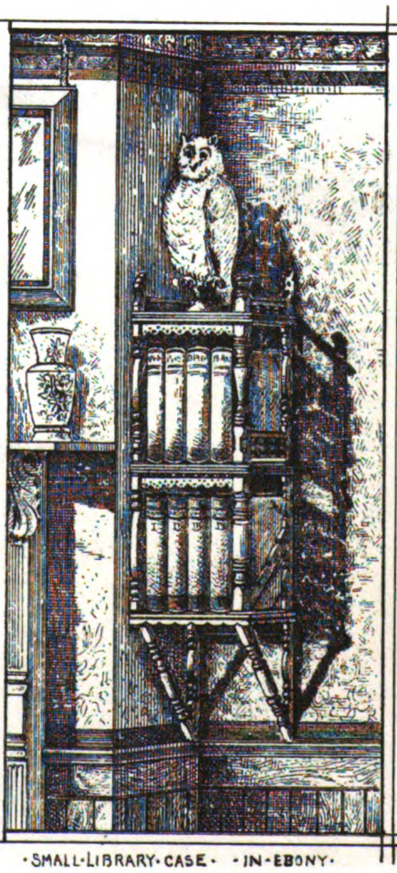
GEORGE · R · CLARKE — Art · Furnishing · Rooms — EDWARD · DEWSON

23 AND 24 STUDIO BUILDING — BOSTON.



Dining-Room. Bric a Brac Cases



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BOSTON, AUGUST 25, 1877.

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THE late burning of Pelstring's cigar-box factory at Cincinnati, by which six or seven unhappy operatives, male and female, lost their lives, has compelled the authorities to make a careful examination of manufacturing establishments in that city. We learn that thirteen out of twenty-nine examined have been pronounced dangerous through want of proper exits for the working-people employed in them. The owners of the condemned buildings have been required to furnish what are considered sufficient means of safety in case of fire. Those who in a spirit of common humanity had provided adequate egress, or with common prudence had built walls which would stand up, received an honorable mention. It is the old story. In the cigar-box factory there was but one narrow staircase, which the fire instantly rendered unavailable. The poor creatures who were caught in this vile trap perished miserably by fire, or were crushed by the speedy falling of the cheap walls; thirty minutes were sufficient to accomplish the whole business. Laws which are made to secure good building are unfortunately applicable, as we have lately intimated, only to large cities, and are enacted and applied only after such cities have become large. We shall probably never know, notwithstanding all our official inspections and our retro-active measures, what insufficient structures yet remain even in our best administered municipalities, until calamity in due time points them out. "It must needs be that offences come, but woe to that man by whom the offence cometh." If grave penalties were really enforced against the owners and builders of such structures, so that peril or destruction of life by reason of their imperfections in any respect should be regarded as *a crime* to be punished by fine and imprisonment, as in Paris, we should, so far at least as the great cities are concerned, have less cause painfully to reiterate in these pages these sad tales of disasters, and less reason to enjoin upon the public the use of common sense, common honesty, and common prudence in the necessary art of building.

IN England the House of Commons early in the present session, aroused by the Brooklyn tragedy, appointed a select committee to inquire into the most efficient mode of providing for the security from loss of life and property in the Metropolis, especially in reference to theatres and places of amusement. Heretofore the control of the authorities over theatres and concert halls has in the absence of definite laws been exercised apparently rather as a matter of propriety than as a matter of duty, and it has been conceded by the proprietors as a matter of expediency. The authorities have thus been enabled rather to suggest than to exact provisions of safety. As regards the construction of such buildings the system of supervision as required by the Buildings Act has not in practice been found to result satisfactorily, as the district surveyors, who act as inspectors and to whose discretion the interpretation of the law is intrusted, do not seem to agree as to its meaning, and materially differ in respect to what constitutes fire-proof material, so that there is no recognized standard of requirements and no adequate assurance of safety. The supervision by subordinate officers having been found insufficient, the committee now propose that this duty shall be discharged directly by the Metropolitan Board of Works acting on their own responsibility, after receiving such professional advice as they may think expedient in each case. The committee does not attempt to determine what structural conditions and arrangements are best to meet the danger of fire and panic, but leaves them to be settled by experts. It however suggests the isolation of such buildings by spaces or fire-walls, the subdivision of risk by fire-proof partitions within, certain distributions of rooms to minimize the risk, numerous and separate methods of egress, passages widening and doors opening outward, avoidance of steps in passages, hydrants and hose so disposed as to command all parts of the building outside and in. Our own laws are so framed as practically to throw upon the inspectors the entire responsibility as to the construction of audience buildings; and as each inspector may have his own standard of safety, and as each may differ from the rest in regard to what constitutes risk, the public do not seem to have the requisite assurance of safety, and seem to be at the mercy of the personal opinions of the official, which may or may not be sufficiently exacting. If he requires what the proprietor thinks too much, there is an appeal provided; but if he does not require enough, the public are not likely to know it until too late. The proposition of the committee of Parliament therefore is worth considering here. The responsibility, where discretionary power is allowed, should be placed as conspicuously as possible, and strengthened by any professional or expert advice required.

WE are glad to hear that Co-operative Saving Fund and Loan Associations, otherwise known as Building Associations (see p. 253), are at last taking definite form with good prospects of success in and about Boston. The testimony in favor of these useful societies multiplies in every part of the country. The Trenton *Gazette* reports that they have done more towards building up that city than any one cause. In Chicago their direct and indirect effect upon the increase of independent homes has been hardly less important than in Philadelphia; under the care of such wise capitalists and sound political economists as Mr. Sidney Myers of that city, there has been erected a class of model houses which we hope presently to be in position to illustrate in these pages, as a record of vital interest to our civilization, and we hope to our art. Architecture will not have vindicated its position and usefulness in this country, until it has given to these great enterprises the benefit of its most earnest assistance.

HITHERTO the main obstacle to the erection of independent homes for the working people in Boston has been the high price of land occasioned by the peculiar geographical position of the city. But now the crowded peninsula has been connected with the main land by extensive fillings on both sides of the original Neck, and the city limits have been widely extended, so as to embrace large districts on the main land in the vicinity, connected with the centre by rails for steam and horse cars, and enjoying all the advantages of municipal care, as is also the case with our insular neighbor of New York, whose boundaries, as we explained on our p. 230, now include extensive and accessible building regions northward on the main land. The conditions are thus materially changed; and the problem of improving the condition of the poor by conferring upon them the comfort and respectability of independent homes, so successfully solved in Philadelphia, Chicago, and elsewhere, may be regarded as fairly open for study in Boston and New York. We have now before us a map of the property of the Metropolitan Land Company, on the Boston and Providence Railroad of Boston, including, we believe, an area of some seven or eight million feet adjoining the old southern boundary of the city, and extending into the district known as Hyde Park, formerly in West Roxbury. This

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region has been laid out in streets and avenues, and subdivided into "blocks." These streets are not always straight, or at right angles, and are therefore we hope fairly and reasonably adjusted to the natural surface of the land. These "blocks" are now selling at public auction, and at the date of this writing, the prices brought range from one cent and less to five cents per foot. Forty per cent of the purchase money is to be paid in cash, and the remainder is secured by a five per cent mortgage note, payable in three years. The opportunity for the application of the Philadelphia or Chicago building systems seems to be clearly presented, and we commend it to the careful attention of all those interested in the welfare of the working people. There seems to be no longer a reason why either in New York or Boston the teeming population should be hived in high tenement houses, or be crowded in squalid lanes, there to be kept low and degraded by evil contact. In such places as this demagogues and communists under various disguises recruit their forces against civilization. To purify these places, and to transfer to new and healthy regions their dangerous overplus of population, constitute a measure in the interests of morality, good government, and public safety. Capital, as we have repeatedly intimated, cannot be more wisely and safely employed than in assisting this important movement in all our great cities; and architecture, combined with capital in this mission, can give to it an efficiency not otherwise to be obtained.

CAPT. M. R. BROWN of the United States Engineer Corps, who has been charged with the duty of inspecting the progress of the interesting work carried on by Mr. James B. Eads, C.E., at the South Pass of the Mississippi, with the object of so deepening the channel as to admit ships of heavy tonnage to the navigation of the river, has made a favorable official report. He states that the mattress work sunk with stone, so as to form continuous jetties on either side of the main mouth or pass, has by the more efficient scour thus obtained increased the depth of the river to at least twenty feet along the whole length of the jetties, with the exception of a shallow strip 140 feet long. This bar, which seems to be gradually yielding to the wash, is the only obstruction now remaining to the passage of ships drawing twenty feet of water. The bars at the mouth of the river, and outside the present limits of the jetties, are receding under the same process; and a careful comparison of the present condition of the gulf bottom outside the delta, with that according to previous surveys, indicates a slight average increase over the area investigated. According to this report, more than a million and a half cubic yards of sediment have been carried out to sea from the river bottom between the jetties, within the last four months. This is a better result than we had reason to expect when we last referred to this important enterprise, just a year ago.

THE New York *Times* complains that academies of art offer to art in a high sense but an indirect and questionable encouragement. It admits that they do succeed in educating a large number of young people up to a point of efficiency in processes that have a certain money value in the market, such as the designing of furniture and interior decorations of all kinds, patterns for stuffs, modelling in clay for the potter, painting on porcelain, tiles, and the like; but considers, on the other hand, that their services stop here. We are hardly prepared to say that there can be no high art without academies and schools of this sort, but it cannot be questioned that they do spread abroad, as no other institutions can, a feeling for art, a sensitiveness to concrete expressions of beauty, that they do encourage, inform, and refine minds so that they are capable of appreciating, enjoying, and making beautiful things; that they do in this manner create an atmosphere eminently favorable to the existence of high art, if not directly productive of it, — an atmosphere in which it would be impossible for one to say, as John Adams wrote in 1819, "I would not give a sixpence for a picture of Raphael or a statue of Phidias." It has been said that Greek art was possible because the whole Greek people were critics. Ictinus himself could hardly flourish among California gold-diggers. The people who have been trained up to a degree of susceptibility to ideas of art are, of course, the most intelligent patrons and critics of art. We all know that in such a state of society, a high standard of architecture, sculpture, and painting is possible and probable; and, if there anywhere exists latent genius, the chance for its discovery and for its development to the extent of its capacity is infinitely increased. If we take care of the pennies, the pounds will take care of themselves; if we take care of our minor industrial manufactures, and breathe into them the life of art, high art will come in due time. Let us, then, continue to study ornamentation, and improve the design of our needle-work, of our cotton prints and woollen fabrics, of our carpets and wall-papers, of our pots and shovels and tongs; for by such humble paths we shall in due time penetrate to the higher regions of pictured friezes and wall-paintings, of statuary in marble and bronze, and of architecture, in fine, illustrated and completed by all the arts.

THE English *Architect* of Aug. 4 opens with an article inspired by the criticisms of Mr. Cave Thomas, on the series of "two-hour studies" done by Mr. Legros before the astonished students of the Slade class, in London, and presented by that artist to the South Kensington Museum. Mr. Thomas, as an artist and a teacher, stigmatizes these clever, hasty sketches, as dangerous and corrupting; encouraging the already too prevalent tendency to "bombast," to "boldness which is synonymous with impudence," and to "the very braggadacio and impertinence of art." Of course the attraction of the results of rapid workmanship, the peculiar charm of the accidental effects in the first rough sketch of a design, whether in the quick black-and-white dash of the painter fired with an idea, or in the rough thumb-work of the small clay model of the sculptor, or in the tentative studies of the architect as he first throws his masses together with a free hand, — these attractions and charms must be recognized as a part of the experience of every person capable of artistic feeling. But when this sketching professes to accomplish finished art without labor, the critic considers that it is baneful to the artist and to art. The boldness which comes of masterly experience and knowledge is a very different quality from that of youthful self-confidence and enthusiasm, or from that courage which is born of the joy of exercising a newly discovered knack or faculty of expression in drawing. This latter quality we must recognize as a prevailing characteristic among our young architectural draughtsmen in especial. It too often takes the place of that *correctness* which comes of patient study and deliberate care, and which is the only proper basis of education in architecture and the other fine arts, as well as in the exact sciences. Young men have no right to presuppose that they are the favorites of fortune, and possess that inborn genius to which study and slow acquisition are unnecessary. There is no royal road to success.

FIRST *correctness, then boldness.* This seems to be the true watchword of the student of art. In our own country, great and venerable monuments and the works of acknowledged masters are not everywhere present, to establish a standard of execution, and to enforce modesty and precision of workmanship on the part of the aspirant. The student who has conquered the first feebleness and indecision of his drawing, at the first opportunity rushes in where angels fear to tread. Our highways and byways therefore are crowded with unstudied and illiterate work, in which knack takes the place of knowledge, and crudity that of correctness. As regards the case in England, our contemporary the *Architect*, alluding, we may suppose, to some of the unconsidered and barbarous work fostered there by the Queen Anne revival, and by the picturesque license of the new mediævalism, says, "In fact, we may here acknowledge without further words that there is a good deal of the boldness which is impertinence, prevalent in England just now, as the direct result of youthful ambition failing to be satisfied in youth, and in a certain measure as the consequence also of the confused condition into which architectural criticism has been brought, chiefly by the vagaries of amateur prophets." Experience proves to us that the establishment of an academic standard by high education is the only means by which boldness and courage in design can be properly subordinated to correctness and precision. The *École des Beaux-Arts* for two centuries has preserved the architecture of France from the illiterateness and superficiality under which we suffer in too many places in this country.

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The obvious duty of those who would raise the standard of architecture, therefore, is to establish schools, in which the superabundant courage of our youth is made to understand and respect principles of art, and the true value of precedent, before it ventures on the dangerous ground of invention and originality. Our own pages, which have hitherto undertaken to set forth within the limits of our opportunities, the higher average of contemporary design, are proofs too often of our need of educated perceptions and of that true strength of the artist which is best expressed in its reserve. We pray that this historical record may be speedily improved for the sake of our good name.

M. BEULÉ ON GREEK POLYCHROMY. — I.

[THE question of the coloring of Greek architecture is always an attractive one, and our readers may find interest in the following extracts, which we have been tempted to translate and partially condense from M. Beulé's *History of Greek Art before Pericles*, because although they are not entirely new, they give perhaps as good a *résumé* of the subject as can be found, and his book is probably not familiar to most of those who will see them here.]

The question of polychromy, or of color applied to monuments, is a modern question, which dates rather from our century than from the generation which preceded us. It is scarcely fifty years since traces of color were noticed on the temples of Greece, and we found that a system which we at first thought was confined to Herculaneum and Pompeii must be ascribed to all antiquity. Those who observed patches of color on Greek monuments asked if they were to be attributed to chance, to the barbarism of primitive times or of a later time, or to principles fixed and formulated by Greek genius. Our surprise had to give way to a patient systematic study, eager to comprehend all the aspects of ancient art, and to conform itself by force of imagination to all its customs. Moreover, these customs are beauties which are to be enjoyed with the greater effort in proportion as they are opposed to those which our contemporaries admire. The natural introduction to the subject is by presenting an historical summary of the question. . . .

It was in 1824 that Hittorf, after exploring the monuments of Selinus, Agrigentum, Syracuse, and Acra, returned to Rome convinced that painting as well as sculpture had contributed to the decoration of the Greek temples, so that the three branches of art had combined their processes and their various science in pursuit of a single end and a more magnificent effect. Returning from his travel, Hittorf stopped at Rome, and found in the Eternal City the sculptures of Ægina, which Thorwaldsen was restoring. The colors of which these statues still bore noteworthy traces agreed curiously with the results announced by Hittorf. Both sculpture and architecture showed themselves at once in a new aspect, and lent each other a mutual support. In April, 1830, Hittorf read before the Academy of the Fine Arts an essay which was afterwards developed into the work entitled, *The Restoration of the Temple of Empedocles at Selinus, or Painted Architecture among the Greeks*. In this work are to be found collated the texts which relate to color as applied to Greek monuments, the discussions suggested by these problems and all the partial problems which attach to them; and moreover all the indications furnished the author by ruins, vases, terracottas, paintings, and sculptured monuments. It is, I repeat, a body of proof in support of a vast and absolute system. A temple of Selinus, that which Hittorf calls the Temple of Empedocles, is the type in which are embodied the various characteristies of polychromy: it is their symbol.

Naturally three theories have been suggested: one which rejects color, another which accepts it without reserve, a third which accepts it with limitations, — the system of mixed polychromy. The theory which rejects color is nowadays abandoned. It is impossible any longer to accuse the Romans, Byzantines, or Arabs of having painted the Greek edifices. So many facts have come to light on every side, proofs so incontestible, that the theory must be given up, at least unless one would do as did a famous *savant*, who, while travelling, turned away his eyes from the places where color was shown him, that he might maintain his freedom of opinion. People have intrenched themselves behind æsthetic considerations, and asked how the ancients could have so marred the whiteness of their marbles. We shall come back hereafter to the question of taste: here the question is simply one of fact. The fact is, that color is found on Greek monuments at Pæstum as in Sicily, in Sicily as in Greece, on great monuments as well as small, on tombs as well as temples. This is why there is no longer any quarrel except between mixed polychromy and absolute polychromy. Was their color everywhere? or was it only the ornaments, the mouldings, and the upper parts of buildings that were decorated? Did color spread its brilliancy, its contrast, its harmony, over the whole monument, or was it only an auxiliary?

The ancients, in speaking of their monuments, describe neither their aspect nor the character of their details. It has been easy, therefore, to contest the indications of the few words which their authors let fall here and there. Vitruvius, speaking of triglyphs, asserts that they originally represented the extremities of the beams that bore upon the architrave. These extremities were covered with boards coated with blue wax. The objection is made that nothing was more natural in wooden temples, but that this was not applicable to stone temples. There were at Athens, says Pausanias, the red and the blue tribunes. This was an exception, is the answer, a freak, just as the ten tribunes at Athens were designated by ten letters of the alphabet. On the walls of the temple at Olympia, and on a stele found near a temple of Minerva at Eubœa, was a coating of milk and saffron, which when rubbed by the finger, centuries after, preserved not only the odor but the taste of saffron. The partition wall around the Jupiter Olympius of Phidias was painted blue. These were also taken to be exceptions, and, for that matter, Pompeii and the tombs had long familiarized our minds with painted interior decoration. The question was of great edifices and of façades. Vitruvius speaks of porticos painted with minium. But these porticos belonged to his time; and he himself in another passage cites minium as a color which is dear and difficult to apply. As for the painted imitations of veined marbles, of which Pliny speaks, it was only a fashion introduced under the emperor Claudius.

Thus the texts were open to objection. It was a good deal, nevertheless, to have found some which furnished precedent and moral support. But the discoveries which followed, one after another, in different parts of the Greek world, gave the theory of polychromy a much stronger support. Stones, in fact, bear testimony no less eloquent than that of manuscripts. It became impossible for the advocates of mixed polychromy to ignore the color which was found on the different parts of temples, one after another. The columns of Metapontus and Ægina were covered with yellow stucco; the capital of Pæstum bore traces of painted honeysuckle; the architrave at Ægina was painted, as were friezes and cornices in all countries; the walls of the Theseum and the temple at Ægina bore marks of color; the very floor was painted at Ægina and Selinus.

But recourse has been had to an argument which it is more difficult to refute: the difference of materials has been alleged, — the difference between white marble and stone. Granted that stone was painted; or covered with stucco, and the stucco painted. But buildings of white marble, the splendid marble of Pentelicus, the Parian, brought at great cost to Delphi and Siphnos, — were they to disappear under a coat of paint? Is not the contrary proved by the fastidiousness which ruled over the drums of the columns of the Parthenon, and which rejected enormous blocks because a greenish stain marred their brilliancy? . . .

But, reply the advocates of absolute polychromy, we only claim for the marble columns a tender, pale tint, hardly a coating to hide their texture; a little Punic wax rubbed on with the aid of heat, and permeating by the effect of expansion the pores of the fresh-cut marble. Some ancient sculptors treated their marble statues thus, making their color less crude, softer and creamy, like old ivory; letting the splendor of the marble shine through while it harmonized it with the whole effect of color. Moreover, your white marble would soon change with the effect of sun and rain; it would be gnawed by the salt wind from the sea; it would gather moss on the side of the north wind, which is the winter wind. Then you would have nothing left but chance color, deterioration, a picturesque dinginess; and meanwhile you would retouch the painted portions, which would remain bright and ever young. Can we admit this? To which the advocates of

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mixed polychromy reply that the surface of marble may be protected, and made insensible to the action of weather, by encaustic appliances, without changing its whiteness. Thus the two camps are pitched at last but a very short distance apart. A tint more or less pale, a question of material which touches but very few monuments (for marble temples are rare in Greece); but for these they would agree: the facts allow no greater disagreement.

It has been said that by virtue of hieratic tradition, that is to say, by respect for religion and under its jealous oversight, the decoration of its temples was scrupulously copied from age to age. Colors had their places, their religious signification. "Red and blue," says Stackelberg, "were sacred colors, as they were in Egypt." The Chevalier Brönsted has since carried these assertions much farther: it would then have been impiety to alter not merely the painted ornaments, but even their arrangement. This theory was accepted at a time when Egypt, just explored by the French expedition, was engaging every one's attention. It had become a habit to subordinate Greece to Egypt, as a province to its capital. Greek art, architecture, sculpture, and painting, was all derived from Egypt. Now in Egypt art was hereditary, — it was so believed, at least; religion ruled and enslaved art. Although the progress of knowledge has reduced this theory to its due limits it has left its mark. Its influence in disguise has its effect on some of our ideas, and such ideas are opposed to the true Greek spirit.

What constitutes the grandeur of Greek genius, and has made it the noblest representative, the essence and model of humanity, is its free development. It broke through this hieratic tradition, which is mere immobility, to create an admirable tradition which is progress, continual advance, the pursuit of infinite beauty and perfection. The word hieratic can be applied only to the primitive epochs of Greek art, for the sacerdotal principle or clerical domination had ceased to exist at the beginning of historical times. The sacerdotal castes had lost their importance, and even the civilization of Homer shows the spiritual power confiscated by the temporal power. In the midst of innumerable divinities and temples of unequal celebrity, and of mythological anarchy, when religion was only an external thing, when what it reverenced was a form, and for the multitude only a form, art was no longer a slave, but a master. This it was that built temples and made gods.

In respect of art, and especially of Greek art, I believe in only one theory, the theory of epochs, because it is just this that analyzes Greek genius in all its developments, and follows its slow transformations, noting from time to time a period of rest, the better to bring out its progress and differences. The theory of epochs is applicable to every thing, and should be applied to every thing, for history itself guides knowledge by its means, and the logic of facts has a force far beyond that of our complaisant systems. We should then apply to polychromy the same method that we apply to all the questions of Greek art, — we should study it by epochs.

While the orders of architecture succeeded one another in public favor; while their proportions were changing and improving continually; while the sculpture of pediments and friezes was in modification, and the forms of architecture becoming finer or more exquisite, its lines purer or softer, its profiling more harmonious or harsher, its details disappearing to give way to others; while, in a word, every thing was in transformation, from the column of Corinth to the Doric column of Pompeii, we have the right to ask if painting alone — I mean painted decoration — escapes this law of progress, so rigorous and so logical even in decadence. Thus far the existence of polychromy has been demonstrated. There remains a more difficult work which our age can, as yet, only sketch out: it is to recover its history.

THE SEWERAGE OF BOSTON.[1] — II.

IF a city built of wood were subject to frequent outbreaks of local fires, its government would hardly hope to avert the danger by putting up fire-proof buildings in the suburbs, — even if they had the justification that the future increase of population would furnish occupants for their new houses.

In our opinion, the city of Boston has, in voting nearly four millions for the new outfall sewer, done something very like this. The suburban area may have been covered with squatters' shanties which might become the starting-point of conflagration; and to this modified extent there would be a certain advantage in replacing them with safe buildings. But the course which would naturally suggest itself would be, to make the houses in the city itself fire-proof. If the chief source of an insanitary condition were as well recognized as the danger from fire, the natural course in this case also would be to strike at the root of the evil at once, — not to adopt an elaborate and expensive scheme for disposing of sewage which has already worked its chief harm, and whose further effect (in the case of Boston at least) is rather nasty than dangerous.

We by no means under-estimate the importance of a good outlet for our foul drainage; but we think the first care should be given to the thing to be let out.

It is speaking within bounds to say that of all the houses in the best ward of Boston, not one in fifty is free from defects in its interior drainage which would become a serious source of danger on the outbreak of an epidemic of cholera or of typhoid in the district traversed by the sewer with which it is connected. It is safe to say also, that no single sewer in the whole city is so arranged, as to ventilation, cleansing flow, and free outlet, that it would not, in the event of its receiving the dejections of cholera or typhoid patients, become a transmitter of infection throughout its whole district. Not that in any case all the inhabitants of the house or the district would be attacked, any more than that all the men in line of battle are shot down. We withstand the assaults of infection wonderfully well; but those who die from infectious diseases die because they are exposed to infection, just as soldiers are shot down because they go into battle. If there is a controlling argument in favor of the new sewer, it is surely the sanitary argument. If the sanitary argument is to control, it should secure the most efficient use of money spent for the improvement of the public health. So far as the public health is concerned, each hundred dollars judiciously spent in improving local sewerage and house drainage within the city would do more good — present and prospective — than any thousand dollars spent on this outlet sewer. The foul air by which the people are being poisoned comes far more from ill-arranged and unventilated soil-pipes, house-drains, and branch sewers, than from the sewage deposits on the outskirts of the town, however offensive these may be. It is not the stink that kills; the effluvium from rotting sewage deposits on our embracing mud-flats may well turn the stomach, but it is rarely formed so near to dwelling-houses as to become a real source of disease. One would be safer from the attack of zymotic poison living in a shanty on the edge of our worst marsh, than in the most luxurious bedroom on Beacon Hill, with a stationary wash-basin at one's bedside.

The first step in the improvement of the public health by drainage is to make sure that while the foul water runs away, sewer-gas shall have no chance to invade our houses; the next is to see to it that neither in the waste-pipe of the house, nor in the private drain, nor in the public sewer, shall poisonous sewer-gas be formed. The accomplishment of all this is easy. It is only a question of intelligent attention to important details, — details of design and of execution. It is here that the city authorities should begin their work, and here they should stick until no single house in the whole city, public or private, is in any thing less than a perfect sanitary condition, and until each drain and sewer is as good as it now is bad. This being done, and all *local* sources of disease being removed, then they may very well turn their attention to some scheme looking to the distant discharge of the sewage of the city. Whether it will be worth while, for a century to come, to go so far as Moon Island, may well be doubted; and it is more than likely that, long before the necessity would arise, we shall have found means for turning the fouler outflow to good agricultural account.

When we consider the exact degree to which the present discharge of filth into the harbor has affected the health of the city, we may almost question whether the sewage might not be delivered for a century to come at Old Harbor Point, without creating a serious nuisance. That offensive smells arise from fouled mud-flats in the *immediate* vicinity of population, is of course true. The degree to which these smells affect public health is not determined; and no sanitarian would consider it an excessive statement to say that for every case of illness arising from this cause, at least twenty cases arise from bad sewerage in the streets, and bad drainage in the houses. If the value of real estate in the neighborhood of Old Harbor Point and Savin Hill would be affected by discharging the sewage directly into the harbor, near the pumping station, the loss from this source would be trifling as compared with the cost of the proposed tunnel alone; and there can be no question that any effluvia arising here would be so diluted before reaching even the nearest part of South Boston, as to be harmless, if not imperceptible.

In our opinion, there are a good many things to be thought of before making an appropriation of $4,000,000 for a work whose uncertain future might remind us sadly of the State's investment in the Hoosac Tunnel, which was also a grand engineering scheme in an equally untried field. If its future could have been foreseen, it would never have been undertaken. Twenty years hence we may wish we had not undertaken the Sub-Neponset Tunnel.

[1] Report of the Joint Special Committee on Improved Sewerage, July, 1877.

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Some pumping system is essential to the proper sewerage of the made lands of the city; but this is a very different affair from pumping the whole drainage of fifteen square miles of city and country, and it may be simply and cheaply accomplished.

Another consideration should not be lost sight of: All or nearly all of the houses on the new lands are built on piles, which were driven with reference to the present level of water in the soil. Mr. Richardson, for example, has piled nineteen million pounds of masonry on the heads of the piles which support the tower of Trinity Church. "As an excess of precaution against any failure of water for keeping the wood saturated," he cut off the piles at "grade five." The proposed new sewer is fixed (at Tremont Street) ten feet below this grade; and presumably, as this is one of the lowest parts of the town, it is in contemplation to carry the drainage far below the heads of these piles. Then what?

THE ILLUSTRATIONS.

THE YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, PHILADELPHIA, PENN. MR. ADDISON HUTTON, ARCHITECT.

(215 South Fifth Street, Philadelphia, Penn.)

THE new building for the Young Men's Christian Association has a front of 72 feet on Chestnut Street, the same on Sansom Street, and of 230 feet on Fifteenth Street; it is five stories in height including the mansard roof, and has a basement story, together with vaults under the sidewalks ten feet clear depth. The first story is divided midway on Fifteenth Street by the entrance (25 feet wide) and staircase to the upper stories. The northern portion to Chestnut Street front is divided into three stores of 24′ x 100′, and the southern part into four stores fronting on Fifteenth Street. The second story contains, on the north, the secretary's rooms, a large reception-room, a prayer-room, and a reading-room and library, extending through two stories; on the fouth, the Association Hall, with two curved galleries, and two stairways to Sansom Street. The seating capacity is 1,300; the seats are upholstered chairs. There are a few rooms on the third, fourth, and fifth floors to be let as offices. A feature worthy of remark on the fourth floor is the gymnasium, which occupies the breadth of the front by 40 feet in depth, and extends in height into the fifth story. Being placed over the reading-room, great pains have been taken (and with marked success) to deafen the floor. This is done by covering the counter flooring with about two inches of calcined plaster mixed with sawdust. The Association Hall has proved a perfect success with regard to sound, and is much sought after for musical purposes. All the walls are brick, but the three fronts from base to cornice, and including the latter, are faced with Ohio (Amherst) stone, square drove. The base is Quincy granite, and the shafts throughout of polished Scotch granite. The interior is finished mostly with shellacked cypress wood, except the stairs; some of these are ash; the main stairway is oak. The sashes and shutters are generally of walnut; the store doors and window frames are of mahogany. The ceiling-light and windows of the Association Hall and of the prayer-room and main stairs are rich with stained glass. All other principal windows are filled with polished French plate-glass. Steam is used for warming the building by direct radiation; and the ventilation is aided by steam-coils, placed in four large ventilating stacks. The boilers, placed under the sidewalk, afford the power for running a passenger-elevator, which plies from the first to the fifth floor, and also for pumping the water to a 5,000-gallon reservoir in the tower, which supplies the greater part of the building. Electricity is called into play in lighting up the Association Hall, and is found to serve the purpose in a most satisfactory manner.

CHAPEL AT ENGLEWOOD, N.J. MESSRS. POTTER AND ROBERTSON, ARCHITECTS.

(52 William Street, New York, N.Y.)

This chapel, now building, adjoins the Presbyterian Church at Englewood, N.J. The walls are of a local red sandstone, laid up in rock-faced ashlar, with finish of a similar stone of lighter color. All caps, carved panels, and diaper-work are of Ohio stone, the sandstone being too coarse in texture to admit of carving. The plan embraces a chapel seating 325, two parlors, an infant-class room, together with pastor's and librarian's rooms. The windows will be filled with rolled cathedral glass in geometric patterns. The interior will be decorated. Estimated cost $18,000.

THE CHURCH OF GROSS-ST. MARTIN AT COLOGNE.

The Church of Gross St. Martin near the Rhine was consecrated in 1172. It is Romanesque in character, and is generally spoken of in connection with the two other churches of the same period at Cologne, — St. Maria im Capitol and the Apostelkirche, of which Fergusson says, "Among buildings on their own scale they are as yet unequalled." But he also says of this one, "it has more of the aspiring tendencies of the pointed style, and though very elegant, its apsidal gallery is too small, and the whole design is somewhat wire-drawn." The massive tower, one of the corner turrets of which is still unfinished, rests upon four arches of one hundred feet rise and forty feet span; these are counterpoised by three half-domes. The lower part of the church was built nearly a century later, and belongs to the transition period. Near the entrance is the font, which is decorated with lions' heads and foliage; this is by some thought to belong to the eighth century, and by others to be a tub from a Roman bath: in either case it was presented to the church by Pope Leo III. at the beginning of the ninth century. The illustration is taken from Dollinger's *Architectonische Reise-Scizzen aus Deutschland, Frankreich und Italien*, published at Stuttgart.

CORRESPONDENCE.

THE POST-OFFICE. — STORES. — THE KENSINGTON BANK BUILDING. — THE RIDGEWAY BRANCH OF THE PHILADELPHIA LIBRARY.

PHILADELPHIA, Aug. 16, 1877.

AFTER nearly four years of work on the foundations of the new Post Office, during which the powerful derricks have been all that was visible to the public, it is very gratifying and encouraging to see the work rising above the high fence enclosing it. The granite work of the first story of the front on Chestnut Street, and about one-quarter of that on Ninth Street, will this week be completed to the top of the first entablature. The granite is dark and very even in shade, and the cutting of the ornamental work appears to be very well done.

West of this, in the same block, Mr. Sims is putting up a store-front in brick and Ohio sandstone. The first floor has four heavy chamfered stone piers, supporting deep brick arches; the central and widest of the openings will be the store window, the entrances being on either side, which are to be closed with iron grills. The story above this has a large oriel window of timber-work, with gabled front supported on wooden brackets, which rest on stone corbels standing out from the central piers. The red brick-work of this and the stories above is relieved with courses of incised sandstone and colored enamelled brick of the Excelsior Company. The cornice, supported on machicolations of brick, is of sheet metal, with very little projection.

Struthers & Sons, the well-known stone masons, have vacated their old-time place of business on Market Street, and opened their offices in a Walnut-street house, to which they have added a very effective front of Connecticut brown stone and red brick; the former, very decidedly predominating, is elaborately carved in medallions and string-courses in high relief. The third floor is run up into a double pair of gables, between which the dormer is hooded out from the roof.

Just above Broad Street, on Chestnut, on the lot adjoining the effective corner building which was put up about eighteen months ago from Mr. Williamson's plans, two stores are in progress from the same architect's designs. The upper floors are supported on heavy fifteen-inch iron girders, which are revealed and ornamented with large rosettes. The divisions of the lower story are carried out in timber work. The upper stories are of red brick with Ohio sandstone trimmings. Much of the brick is laid angle-wise to the face of the wall, so that what are usually flat wall spaces present a great deal of light and shade.

The new building of the Kensington National Bank at the south-west corner of Frankford Road and Girard Avenue is from drawings by Mr. Furness. The building occupies a lot 48′ x 52′. The entrance being on the corner, the angle is cut off very much in the same manner as was done with the Centennial National Bank building opposite the Pennsylvania Railroad Depot on Market Street, West Philadelphia. A small balcony over the door, supported on heavy corbels, is the only feature of prominence, the mouldings and cornices having very small projections. The windows on the sides of both stories are in pairs, and quite broad, giving ample field for some very spirited wrought-iron work. The material of the building is granite, the pilasters and quoins having rock face. In the interior, besides the usual bank furniture, the officers' and other rooms are partitioned off on either side of the central block formed by the safe; the second floor being very little more than an iron gallery running all around, supported on perforated plate-brackets of the same material. The ceiling is dome-shaped, entirely of iron, supporting a large skylight. The iron panels of the former will be picked out in gold and colors.

Mr. Furness has also under way a building intended as an adjunct to the Jefferson Medical College on Tenth Street above Walnut. The building will be very plain, but a rather bold combination of materials. It will be of three stories, and is to be used for the private rooms of the faculty, chemical and other apparatus. The first story of the front will be of iron, above which the horizontal portions of the building will be mainly of granite, and the perpendicular supporting masses of brick.

The Mercantile Library Building, which was damaged by the fire which destroyed the adjoining theatre, has been repaired. The most noticeable improvement which has taken place is the interior painting of the walls and ceiling, the bold stencilling and color-decoration of which have been directed by the same architect.

The work of rebuilding the theatre on Chestnut Street has been actively commenced.

The large building erected in compliance with the will of the late Dr. James Rush on the block bounded by Broad, Thirteenth,

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Carpenter, and Christian Streets, is at last completed. The provisions of the will were very peculiar, and the building is in many respects equally so. Intended for the use of the Ridgeway Branch of the Philadelphia Library and also as a mausoleum for Mr. John Jacob Ridgeway, his daughter Mrs. Rush, and Dr. Rush, it is offered to the Philadelphia Library Company by the executors, provided it shall remove into the new building from the one now occupied on Fifth Street south of Chestnut. Exteriorly the building is of granite in Grecian-Doric style. The Broad Street front, 122 feet in length, has three porticos of equal height, the central pediment supported by eight, and those on either side by four, fluted monolithic columns. All the columns being of equal length, has the effect of making the side-porticos appear higher than the central one. Almost the only carved detail of the exterior consists of certain very clumsy and badly-designed floriations, which occur in the pediments, and had better have been entirely omitted. The roof is of beton, supported by a corrugated iron construction; in the beton are laid strips of wood to which the tin covering is fastened. The interior shows the central portion of the building given up to a large hall, around which on the first floor are officers' rooms, directors' rooms, etc., while immediately facing the entrance, and lighted by a wretched little stained-glass window, is a small room which will contain the commemoration stone. The space above these rooms forms a gallery, and the ceiling (this portion being entirely lighted by skylights) is supported on massive pilasters and Roman-Doric columns of the lightest cast iron. The entablatures and all the upper decorative work of cornice and ceiling are of stamped and cast zinc, which has been painted in a manner that shows more acquaintance with the works on the modern German classic revival than any feeling for the fitness of certain colors for certain places. The floors and main stairways, as also the entire entablature which finishes the edge of the gallery, and all the doors and their frames, are of oiled oak or ash. One would have supposed from the appearance of the exterior of the building and its history, that the floors and stairways would have been of stone or tile; although as to the matter of security against fire, the isolation of the building is its best security. The north wing of the interior is fitted up with light iron stairs and galleries and cases for the reception of books; and the south wing will be used as reading-rooms on the first floor, and on the second floor the rooms will be devoted to the library and some of the *penates* of the persons the work is to commemorate.

The call for plans issued by the commission appointed to select a site and erect a new Hospital for the Insane for the South-east District of Pennsylvania, is a most extraordinary piece of English composition. Indeed, it is no easy matter to understand what is called for and how the architects are to be dealt with. In the first place, the resolutions read very much as if all the drawings submitted were to be held for the use of the commission. There seems to be some confusion in the minds of the members of the commission as to the value of the terms "plans" and "elevations," as they refer to "a general ground plan" and "a plan in elevation." An isometrical perspective, although it is pretty evident that that is what the commission want, is not mentioned.

During the month of July there were issued by the Building Inspectors permits for 482 new buildings and for 119 alterations and additions.

MARBLE FRONTS. — THE PEABODY INSTITUTE. — CHURCH OF ST. MICHAEL AND ALL ANGELS.

BALTIMORE, Aug. 14.

THE summer here has been characterized by the usual amount of cheap contract work in the way of numerous rows of dwelling-houses in all the new portions of the city, moderate sized, badly planned, and badly built. In one respect only has there been an improvement in this class of work; namely, in the very extensive use of Baltimore County white marble for the fronts of these houses, in place of the formerly almost universal pressed brick with white "trimmings." As many as fifty of these houses are now in course of erection in the north-western section of the city alone. The best effect in this style of work is obtained from a rough tool finish, the courses laid in broken range, with dressed lintels and sills: a certain amount of carving in relief also appearing in many of the designs. Although few of these houses are above mediocrity in architectural design, they have made a very decided step in advance of the old stereotyped front, and show a certain amount of thought and study, and open the way for much more.

The vicinity of the Washington Monument is at present undergoing a very marked change in the improvement of the two squares of Washington Place which till now have been blank parallelograms of grass, carefully protected by high and massive iron railings in the most funereal style, but without even the addition of a tombstone to give them any interest. They are now stripped of their railing, and are being transformed into terraces and flower-gardens, adorned with statuary, fountains, and ornamental lamps, after the designs of the architect of Central Park, at a cost of $18,000. The two similar squares at right angles to these in Mt. Vernon Place are only awaiting the necessary funds to be embellished in like manner.

Another very decided improvement in this portion of the city is the completion of the Peabody Institute after Mr. Lind's design. The west wing of this building has been completed and occupied as a library and music and lecture hall for several years. Ninety-eight feet have now been added, making the building complete and symmetrical, according to the original design, in smooth dressed white marble, modern Italian classic in style. The interior gives a library measuring 84′ x 70′ x 57′, which will hold from 250,000 to 450,000 volumes, arranged in six galleries of alcoves, each 8′ in height. There is also a lecture and music hall measuring 100′ x 66′ x 40′. The former library and reading-room are arranged *en suite* with rooms in the new building, and form a group of art-galleries. The building is fire-proof, the floors formed of iron beams and girders, filled in between with Tiel blocks, as are also the bays between the roof-rafters: the partition walls are either of brick or Tiel. All the interior finish is of cast iron. Black and white marble tiling is used throughout.

Mr. Lind has also designed the large cast-iron front for a warehouse which is about to be built for Messrs. Armstrong and Cator on Baltimore Street.

The congregation of the church of "St. Michael and All Angels" recently obtained drawings in friendly competition from five architects for a new church which they intend shortly to build. From this number the design of Messrs. Wyatt and Sperry was selected. This design shows a building 122′ x 100′, perfectly cruciform in plan, without columns or any interior obstruction to a view of the chancel. The material to be used will be "Falls Road blue stone." The style is somewhat Norman, round arches alone being employed, and the effects gained rather from broad, simple masses than detailed ornamentation. A tower and spire 170 feet high is placed in the angle of the nave and transept. The estimated cost of the completed building is about $80,000, but only a portion, consisting of the two transepts, is to be built at first.

Messrs. Wyatt and Sperry have also on hand a large frame country residence for Mr. Joseph Hopkins in Baltimore County; and a swimming-bath, consisting of a pool 40′ x 20′, and 5′ deep, with dressing-rooms, etc., the whole treated in an ornamental rustic style in stone and wood, at the country-seat of W. H. Perot, Esq.

ARCHITECTURAL DICTIONARIES.

WESTERLY, R.I., Aug. 13, 1877.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — Can you by letter, or through the columns of the *Architect*, give me the names and cost of the best architectural dictionaries or encyclopædias now in use? also the names of the author and publishers, and the address of the place where the books may be purchased. Very truly yours,

J. IRVING MAXSON.

[WHAT promises to be the largest general architectural dictionary is that of the Architectural Publication Society of London, now carried as far as the letter O. Gwilt's Encyclopedia of Architecture (Papworth's edition) covers the subject of which it professes to treat very thoroughly, and is probably the best work of its kind in English. Parker's Glossary of Terms used in Grecian, Roman, Italian, and Gothic Architecture, is regarded as the highest authority in England with regard to English mediæval work (John Henry Parker, Oxford, England). Viollet-le-Duc's *Dictionnaire Raisonné d'Architecture Français* covers the same ground with respect to French mediæval work, but in a manner far more exhaustive. Rosengarten's Architectural Styles, published by D. Appleton of New York, although not a dictionary, may prove useful in explaining the more general terms. The Paris publishers, Firmin Didot & Cie., are now issuing in parts the *Dictionnaire Raisonné d'Architecture et des Sciences qui s'y rattachent*, by M. Ernest Bosc. In German, Lübke's *Geschichte der Architektur* may be read to advantage, although more strictly a history. Herr Mothe's new *Baulexikon* in three volumes, copiously illustrated, is also highly spoken of. The older works of Nicholson, Stuart, and others of London on this subject are now out of print of course, and out of date in many respects, but may be picked up cheap at second-hand bookstores. The Dictionary of Terms, published by John Weales of London in his well-known series of technical papers, is inexpensive and useful. The prices of these works may be best obtained from any good book agent or publisher. — *Ed. American Architect.*]

DID BISMARCK KNOW? — The Emperor of Germany has given 9,000 marks and 2,000 kilogrammes of gun-metal to the new Roman Catholic Church of Ems.

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BLACK MORTAR.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

FOUNDRY sand is sometimes used for making black mortar: I believe the Government employs it in preference to other methods.

T. M. C.

THE MASONIC TEMPLE AT NEW HAVEN.

NEW HAVEN, Aug. 15, 1877.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

IN the Aug. 4 issue of the journal, under the head of a brief entitled "Good Workmanship," appears the following: "It is said that the Masonic Temple at New Haven, which has been built but five years, has been declared unsafe, the walls being far from perpendicular." By a recent vote of the aldermen, the owners have been notified to make certain precautionary repairs in accordance with recommendations of the commissioners of public buildings. The walls, it is true, are out of perpendicular, but not over three and a half inches, as a maximum, in the whole height of seventy feet. The thickness of the walls is 20 and 13 inches.

In justice, however, it should be said that other and combined causes led to the recent investigations. The building was erected in the usual modern haste. The joists and other timbers were, from *necessity*, ordered direct from the lumber regions, where they were sawed, then shipped, and placed in the building wholly unseasoned. To their subsequent shrinkage a large percentage of the visible defects is due. The remaining causes are owing variously to slight deflections of a few girders and to concussions from marching on the armory floor. This marching, it is believed, can be continued with perfect safety after the introduction of a few additional ties and the possible substitution of iron girders in place of the present deflected wood and iron combination girders.

J. W. M., *No. 5 Masonic Temple.*

THE CATACOMBS.[1]

THERE are few subjects on which more extreme opinions are entertained on both sides than the catacombs of Rome. An archæologist has nothing to do with any theological question; but the catacombs belong really to archæology more than to theology. The question of the dates of their construction, and of the fresco pictures, are questions of fact, not of theory, and must be decided like other such questions by the principle of comparison. Persons who have studied the history of the art of drawing can see the date of a picture at a glance, just as one accustomed to the study of architectural history can see the date of a building. There is no doubt that the catacombs were the general burial-places of Rome for three or four centuries, for all those who had not family tombs by the side of the roads. All the space allowed for tombs on the roads had been occupied during the seven hundred years from the foundation of Rome to the Christian era, which is also the beginning of the Empire; and it is clear that some of the catacombs are of the first century, as is shown by the construction of the walls and the architectural details, where any can be found. This is especially the case with the very large and important one of Prætextatus, where some of the brick walls are distinctly of the time of Nero (there is no mistaking the long thin bricks of his time, which are found in all the buildings known to be of that period, and in no others). They continued to be used as burial-places until the sixth century. In the seventh they were so much damaged in the siege of Rome by the Lombards, that the ecclesiastical historian says "they annihilated the catacombs." After that time, when Charles the Great came to Rome, at the end of the eighth and the beginning of the ninth century, there was a general revival of the building of new churches and restoring of old ones; and it was the same in the catacombs: great restorations were made at that time, but no new ones were made. They were so far restored as was necessary to encourage pilgrimages to them in the ninth century (and the same has been done again in the nineteenth!) The most remarkable buildings connected with them are the chapels at the entrances to them, for the burial-service. At first these were underground, but close to the entrance. After "the peace of the Church" had been declared by Constantine, they were built above ground, near the entrances, of which there are many remains more or less perfect, especially at that of Prætextatus. There were several ways into this very extensive catacomb. One of them seems to have been from a subterranean road between the Church of St. Sebastian and St. Urban, in the district called by the name "of the Catacombs." It is close to the circus of Maxentius, and the tomb of his son Romulus, which is called *ad Catacumbas* by the contemporary historians. But as these burial-places are older than the time of Maxentius, the district may have been named from them, and not they from the district. This is the valley under the hill on which the great tomb of Cæcilia Metella stands. The Church of St. Sebastian also stands in it. This was originally called *the* Catacomb, because the entrance to many of them in that district was through that church. But the name is quite mediæval; that used by Anastasius and all the early writers is *cemeteria*. The earliest pictures are in the subterranean entrance-chapel of Prætextatus, where the vine is painted on the vault, and spread all over it, and is of the second century. On the wall of this chapel was a Good Shepherd; and the Roman Catholic antiquaries claim this as a proof that this catacomb is exclusively Christian from the beginning. But those who have studied the history of painting could see that the Good Shepherd was quite of a different class of art from the vine, and more probably of the fourth century. (I am sorry to say that this picture of the Good Shepherd has been destroyed in some repairs made about 1875.) Those who are at all acquainted with the catacombs will not need to be reminded of the very narrow passages called *corridors*, or *streets*, with the *loculi*, or graves, cut in the tufa walls on each side; nor of the numerous steps down into them, and the variety of small vaulted chambers called *cubicula*, one of which is frequently the burial-vault of a family. Many of these chambers of the fourth and fifth centuries have columns at the angles, with capitals and bases, and seats, with side-boards, all cut out of the tufa. The very large catacomb of Prætextatus was certainly not exclusively Christian: there are distinctly Pagan subjects in one of the chambers at the foot of the steps of one of the original entrances, and these are of the third century. In another chamber, or *cubiculum*, very near to this, the subjects are Christian, of the fourth century, apparently because the family had then become Christian. The burial-place of the worshippers of the Persian god Mithras is almost, if not quite, a part of this great catacomb, which is on the Via Appia, about two miles from Rome, at the corner of the cross-road that leads past St. Urban's. (If excavations could be made there, they would settle some long-disputed questions.) The principal catacomb, or burial-place of the Jews, is also very close to this. Parts of this are of the first century, others of the fourth. The inscriptions and emblems in this are of special interest. (I am sorry to say that an Englishman purchased of the late Jew owner some of the most interesting and important of these emblems, and carried them off to his private museum in England, where they are of comparatively little interest. In their original places they were historical.)

The catacomb of St. Priscilla is considered by the Roman Catholics as the most interesting for the frescoes, which they consider as very early; some writers have even said they are as far back as the first century. Great stress is laid in particular on the chapel called the Capella Græca, which is in the form of the Greek cross, and may probably be of the third century, at the time that two of the bishops of Rome were Greeks, and there was no difference between the Greek and the Roman Church. Whether any of the frescoes of Christian subjects are really before the time of Constantine, is very doubtful. One small picture on the soffit of the arch of an *arco-solium* (or niche for a sarcophagus), which is about two feet square, and represents the Blessed Virgin, with a star over her head, and with some one addressing her, called "the Prophet of Bethlehem," is said by the Roman Catholic antiquaries to be very early. If compared with the frescoes in the painted tombs on the Via Latina, which are dated by brick-stamps in the walls, as of the third century, it seems hardly possible to imagine that any of the paintings in the catacombs can be of the same period. The drawings of them are very inaccurate when made out by modern artists: the photographs are the only really accurate representations of them. In this catacomb is another celebrated picture, that of the wine-barrels, to which various symbolic meanings are attached. It appears to me to have been the burial-place of the wife of a wine-merchant, and an inscription that was under the picture when my photograph was taken seems to agree with this; but this inscription has since been removed by the authorities. Another interesting picture is said to be the "Woman of Samaria at the Well;" and this seems probable. In very many of the catacombs there are figures in the Oriental attitude of prayer, erect, with the hands uplifted. Sometimes they are at the four corners of a vault, supporting a central picture, perhaps the head of Christ, or the Good Shepherd. In other instances the *orante* is addressed by others. The *orante* are supposed to represent the persons interred, and many of the groups of figures are believed to be family groups. There are also many representations of feasts, which some call *agapæ;* others, the Last Supper of our Lord. Some are evidently family burial-feasts, according to the well-known custom of the ancient Romans. The history of Jonah was a very favorite subject, with all parts of the story: sometimes he is being thrown overboard to a sea-serpent (which is the Vulgate version of what in the English version is translated a whale); sometimes he is under the gourd. We know by illuminations that the history of Jonah was a favorite subject with the artists in the fifth and sixth centuries; and some of these catacomb-pictures are of that period. The three children in "the burning fiery furnace" is another very common subject; also Moses striking the rock, Daniel in the lions' den, Noah in the ark, represented as a box. The most popular pictures in the catacombs, because the best preserved, are those in the catacomb of St. Pontianus, in the Trastevere on the Janiculum. Among them is the baptism of Christ, the jewelled cross, two large heads of Christ, and three figures of saints standing side by side with their names written vertically. They are painted on a wall that crosses one of

[1] From a lecture delivered by Mr. J. H. Parker at the rooms of the Royal Institute of British Architects, July 12, and printed in the *Builder*.

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the corridors, evidently a repair of the ninth century, as the wall on which it is painted is of that period. A comparatively small part of this great catacomb has been restored for the pilgrims. I have crept through a hole in the wall, and have got behind this cross-wall, and found the rest of the catacomb in a state of complete ruin, as left by the Lombards.

NOTES AND CLIPPINGS.

THE ACADEMY OF MUSIC, PHILADELPHIA. — The American Academy of Music, at the corner of Broad and Locust Streets, is undergoing extensive repairs and alterations. Many of the improvements look to securing the safety of the audience and performers in case of fire. All staircases leading to balconies and dressing-rooms have been furnished with hand-rails. An iron fire-proof stairway is being built outside the stage end of the building with communicating doors from the dressing-rooms of the ballet, and all the female artists on that side of the stage. Powerful hand force pumps have also been placed on the stage and in the flies, and provided with hose and all other necessary appliances, in addition to the steam pumps, hose, buckets, and other arrangements already in existence. Above the proscenium is a large iron girder supporting a heavy brick arch, upon which rests the brick wall which separates the flies and "rigging floor" from the auditorium. In the space between the chord of the girder and the brick arch the wooden ornamentation of the proscenium is built. It is now proposed to back this with a furring of woven wire, and cover it with a heavy coat of plaster, so as to make a complete fire-proof division between the auditorium and the stage all the way from the top of the curtain opening through and above the roof.

STRIKE OF QUARRYMEN. — Five hundred quarrymen in the quarries in New Jersey have struck work, and have agreed to refuse to deliver blocks for less than $15 a thousand. The blacksmiths who sharpen the tools for the men complain that if the "right spirit had existed in the quarries, the price of blocks would have been raised long ago." As it is, they say they will not sharpen another tool as long as the quarrymen have any dealings with the present contractors. The quarrymen, in return, state it as their intention to stop work entirely until new bids for blocks shall be received from men who can give security for a faithful performance of a royalty contract; and the blacksmiths have agreed to stand by them, and sharpen their tools on credit if necessary. On the other hand, the contractors think that they have enough blocks on hand to finish existing contracts.

THE NICARAGUA CANAL. — Mr. O'Sullivan, who has always been prominently interested in the proposed inter-ocean Nicaragua Canal, has lately been at the State Department, in Washington, on diplomatic business connected with that enterprise. He says the work will cost $80,000,000, and can be completed within five years. No appropriation will be asked of Congress, but subscriptions opened in all parts of the world. He speaks confidently of the success of the work, the surveys for which have already been made by the United States Government.

ACCIDENT. — As Theodore Gerald, a man forty-five years of age, was engaged, a short time ago, in painting the outside of the cupola of the High School building at Evansville, Ind., he attempted to shift the steeply-inclined ladder upon which he was standing, and caused it to topple over into the street, one hundred feet below. He himself fell headlong through a distance of forty-five feet, and struck the roof within about two feet of the gutter. Fortunately the force of the blow was sufficient to drive his head and shoulders so firmly through the slates and boarding, that his further fall into the street below was prevented. Although terribly cut and bruised about the head and shoulders, he is expected to recover, as, strange to say, the skull was not fractured, and the doctors do not fear serious internal injuries.

A LARGE BLOCK OF GRANITE. — There was recently quarried without the use of powder at the Barre, Vt., granite quarries, for the use of the Oliver granite works at Rutland, a block weighing about six hundred and eighteen tons, — being forty feet long, seventeen feet high, and ten feet thick. This immense stone is said to be perfect in every respect, and is believed to be the largest block of granite ever quarried in the State.

THE KENTUCKY NATURAL BRIDGE. — It is stated that the famous Kentucky natural bridge over Caney Creek, in Elliott County, broke in the centre of its arch, a few days ago, and fell in magnificent ruins.

THE QUEEN AND ST. ALBAN'S ABBEY. — Her Majesty Queen Victoria has departed from her general rule of conduct in the matter of restorations, and has subscribed £100 for the restoration of St. Alban's Abbey, because of its great historical and antiquarian interests.

REBUILDING ST. JOHN, N.B. — The citizens of St. John are forming a loan and mortgage association to raise money in England at a low rate of interest, for rebuilding the city, at least $2,000,000 being wanted.

CHINESE BRIDGES. — It is probable that the Chinese were the inventors of suspension, or, as they are called in China, flying bridges. The use of suspended bridges in China dates back to the Han dynasty, which flourished 1,600 years ago. There still exists in Shen-se a bridge of 400 feet span, which is suspended over a chasm 500 feet deep. Most of these bridges are so wide that four horsemen can ride over them abreast.

AN OLD LONDON GRAVEYARD. — The London *Standard* of Aug. 1 says: "At the Guildhall, Westminster, yesterday, before the Assistant Judge at the Middlesex Sessions, Thomas Bouffler appealed against an order of the Parish of St. Mary, Islington, to demolish premises known as new Bunhill-Fields. Mr. E. J. Jones said he had known the ground for 43 years, and had been proprietor of it. It was closed as a burial-ground in 1853. There were thousands of funerals there to his personal knowledge. The ground was completely rotten. It was a burying-ground before 1802, and had been used for funerals three times over, bodies being buried above those already interred when the coffins became rotten. They were anxious to make the most of the ground, and put the coffins as close to each other as possible. Mr. Bouffler, the appellant, had all the books, and would never produce them. In the register books of the burials in the whole of the ground, there were upward of 6,000 entries from 1802 to 1853. On that particular spot where the houses were built there was room for 90 graves, and they, on an average, put nine coffins in each grave. There would therefore be about 600 or 700 bodies in that part of the ground. In digging for the reception of fresh bodies, if they found coffins at all rotten, they knocked them to pieces. The ground was perfectly honeycombed with bodies and in a state of corruption. Some of the coffins were removed in the night so that the inhabitants should not be frightened by their removal. They had buried from 23 to 25 on a Sunday, and the average of Sunday burials was about 18. On week-days the burials were three or four a day. A great number of burials took place there from the Fever Hospital. The particular spot on which these houses had been erected was not drained at all. The whole of the ground was made up of bones, rubbish, wood, and remains of bodies. When a body was required to be buried, a searching-iron was put down, and if it struck against a coffin, and there was not sufficient depth, then it was withdrawn, and a fresh search was made. Joseph Fursman said that when some coffins were dragged out the men employed were up to their knees in black slush, and stimulants had to be given them in consequence of the stench. The Assistant Judge held that this was not a case that came under the provisions of the Artisans' and Laborers' Improvement Dwellings Act, and quashed the order with costs."

THE ISLAND OF IONA, SCOTLAND. — Forty Scottish kings, two Irish kings, one French king, two Irish princes of the Norwegian race, beside innumerable chieftains and ecclesiastics, are said to have been buried in Iona, Scotland.

GEOLOGICAL DETERMINATION OF DATES. — We mentioned some time ago (p. 138) that M. Kerviler, while making some excavations in the valley of the Loire, had discovered that the annual layers of alluvial deposit could readily be counted, and consequently the age of the deposit could be determined by a simple process of enumeration. Lately Prof. Bertrand has discovered near St. Nazaire, France, the remains of a Gallo-Roman or Celtic harbor in which the layers of alluvial deposit can be counted back for 7,200 years. Each one of these layers is extremely thin, and yet is composed of three subordinate layers, the first of which is of a brownish color, and is evidently the deposit made in the autumn by leaves and other decaying vegetable substances; the next layer is white, and is formed of the chalky deposits that are washed down by the spring rains; and the third is yellow, and is composed of the sandy deposits that are made during the summer.

THE GIBRALTAR TUNNEL. — The project for building a tunnel from Algeciras in Spain to a place between Ceuta and Tangiers in Africa is still alive; its projectors have already raised a considerable portion of the $20,000,000 it will cost, and Spanish engineers are said to be in Marseilles negotiating for apparatus similar to those used in the St. Gothard tunnel.

ART THEFTS. — One of the finest carved ivory tablets of the Nimrod Gallery in the British Museum has disappeared. Thieves have also mysteriously carried off from the Modern Halls of the Brera Palace at Milan a fine landscape by Fasanotti and five other valuable paintings.

A NEW FIND IN ATTICA. — The archæological treasures found in a tomb in the rock at Spata, in Attica, have arrived in Athens. They consist of ornaments in gold, silver, ivory, and a substance resembling glass. They are of the same epoch as those discovered at Mycenæ, but finer.

STRENGTH OF CEMENTS. — The Royal Society of Engineers at Berlin has lately made 3,150 tests of cement mixed with different proportions of sand. Blocks measuring 4″ x 4″ x 2¾″ which had hardened for ninety days were subjected to pressure with the following results: pure cement, average pressure at which first crack appeared, 4,125 pounds; average crushing pressure, 4,708 pounds. Equal parts of cement and sand, first crack appeared under an average pressure of 3,058 pounds; crushed by an average pressure of 3,527 pounds. One part of cement to two of sand, first crack appeared under an average pressure of 2,375 pounds; crushed under an average pressure of 2,773 pounds. One part of cement to three parts of sand, first crack appeared under an average pressure of 1,849 pounds; crushed under an average pressure of 2,375 pounds.

IMPROVED MORTAR AND ARTIFICIAL STONES. — M. Decourneau attributes the cracks in common mortars and cements to the uncombined quicklime that they contain. In order to neutralize the lime, he uses an *agrégat* composed of a very fine silicious powder mixed with diluted nitric acid. He thus obtains mortars with much greater, more uniform, and more lasting resistance than those hitherto used. The application of his method, especially in the new forts of Paris, has given excellent results, without a single failure. Stone made by his process may be sawed and chiselled like natural stone.

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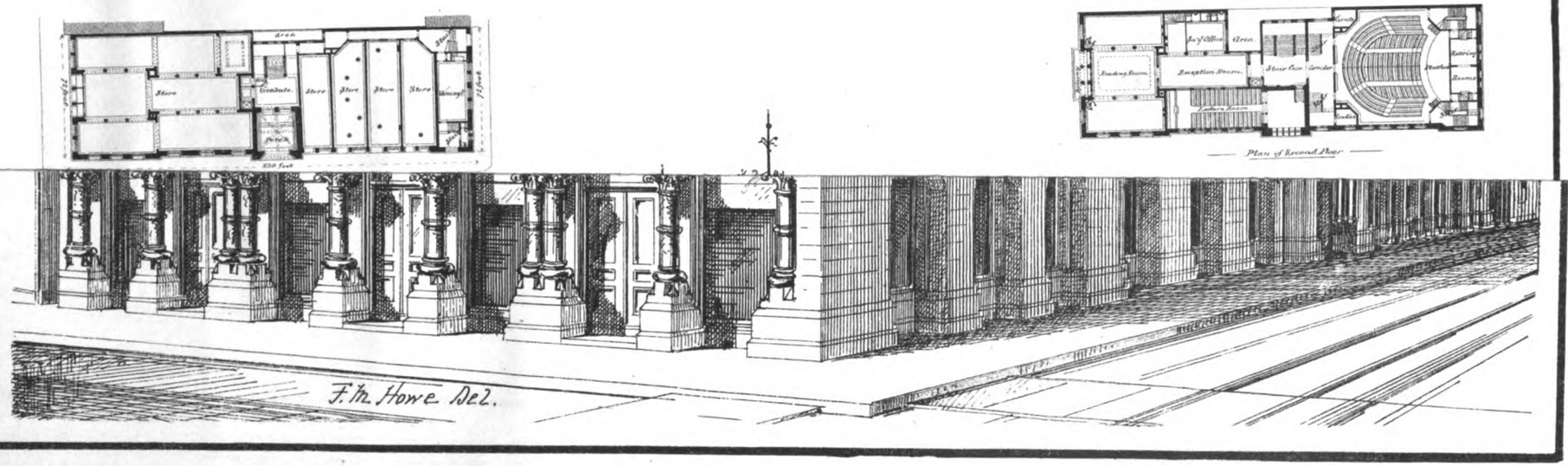
BUILDING OF THE Y. M. C. ASSOCIATION.
PHILADELPHIA.



ADDISON HUTTON, ARCHITECT

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Chapel at Englewood, N.J.
Potter & Robertson, Architects.
52 William St., N.Y.

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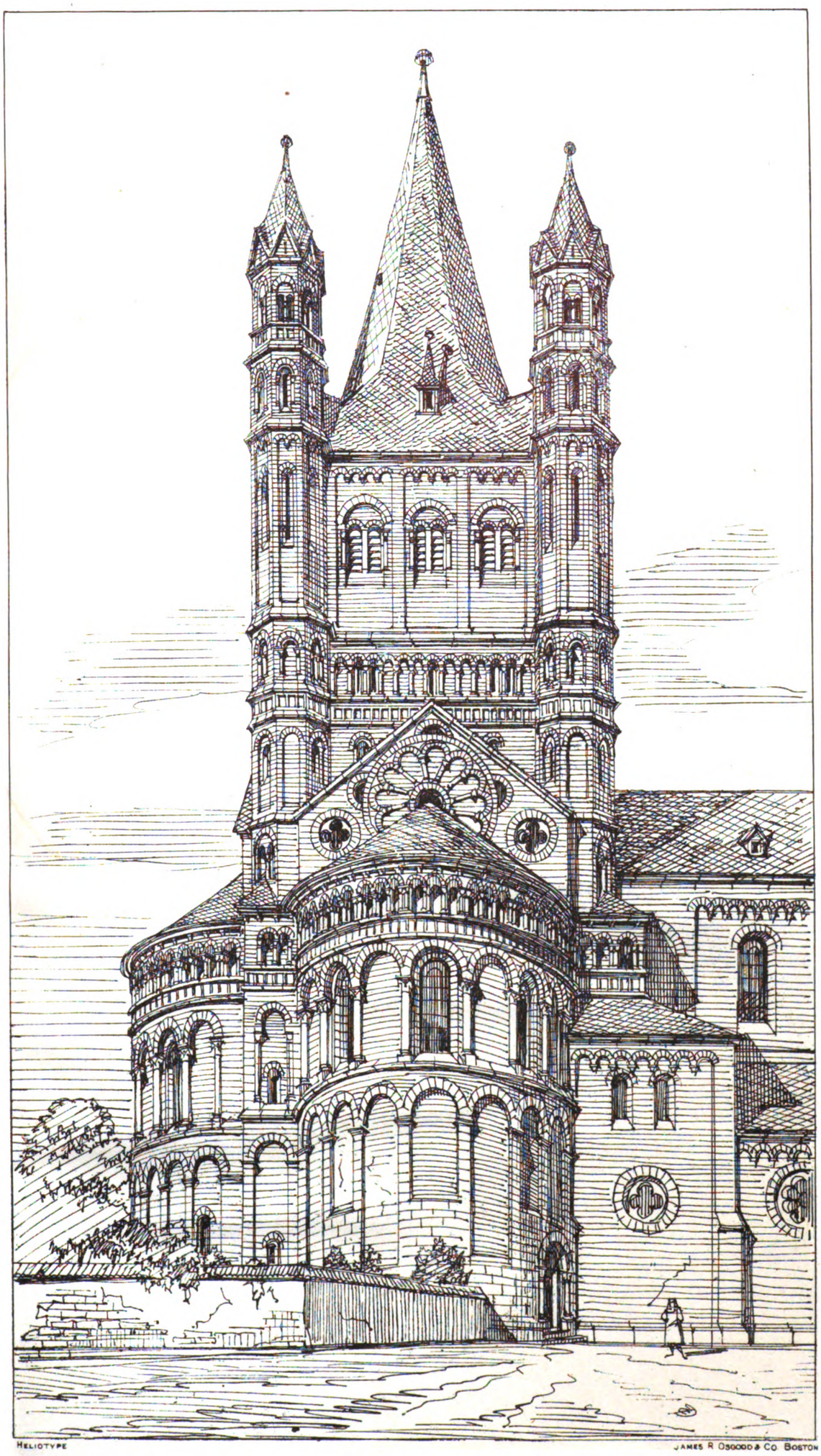

Gross St. Martin at Cologne.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, SEPTEMBER 1, 1877.

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IT is recognized that an inexpensive fire-proof construction is, from a practical point of view, the most valuable contribution which can be made by science to the art of building. Last week we promised to present to our readers some statement of the important work done by Mr. Sydney Myers, manager of the Merchants', Farmers', and Mechanics' Savings Bank of Chicago, in building houses for the working-classes in that city. In fulfilling this promise on page 281 of our present number, we have occasion to include a very interesting, and what seems to be a very practicable, project for effecting this most desirable reconciliation between economy and the provisions to secure safety from fire. We need hardly apologize for giving up so much of our space to the consideration of a subject so important. For many years it had been the policy of this bank to loan money to its depositors on the security of their land, to assist them in building thereon. But the city ordinances which came in force after the great fire requiring a more substantial structure than could be built with the usual amount of those loans, the bank, in order to meet the emergency in the most effective manner, in October of 1874 offered a prize of $1,000 for plans, specifications, and tenders of contract, for the best and cheapest approximately fire-proof dwelling-house, occupying not less than 5,500 cubic feet, and containing at least five rooms; also for a store and dwelling-house combined, to occupy not less than 30,000 cubic feet. The fire-test was to be applied, under the direction of a committee of judges, to the first building erected. Previous to Jan. 1, 1875, more than thirty sets of plans were received in reply to this invitation; and on the 16th of the following August, after a fire-test described in the report of the judges (see page 281), the prize was awarded to Mr. A. J. Smith, architect, of Chicago, for a one-story house 20′ x 43′, costing $1,200; for a two-story house, 18′ x 26′, costing $1,700, and for a store and dwelling combined, costing $3,600. The plans, elevations, and sections of the first two buildings, are elsewhere reproduced.

THE universal intelligence and public spirit manifested in this enterprise deserve more than a local recognition. It was a well directed movement towards the accomplishment of that union between architecture (as an art and a science) and common building, which on page 253, in referring to the great Philadelphia building-operations, we mentioned as one of the urgent needs of civilization. In England the greatest masters of architecture have been called upon to devote their most earnest study to this subject; and what progress may have been made in that country towards the scientific, artistic, and inexpensive construction of cheap houses, is mainly attributable, as we know, to their efforts.

"FEW buildings," says Mr. Sydney Myers, "are erected without the aid of those who loan money. If investors will scrutinize the architects' specifications, and require approximately fire-proof construction, and if underwriters will discriminate their rates in favor of buildings so constructed, it is believed that great conflagrations may soon be as rare in this country as they are in Europe, where like experiences in early time have secured the general adoption of preventive precautions such as are now sought to be introduced in the United States."

WE regret to learn, that, although the time for exhibition of the Castellani Collection of marbles, bronzes, terra-cottas, jewelry, engraved gems, and other objects of art, expired on the first of last July, but a very small part of the $300,000 needed for the purchase of it has been obtained. Negotiations, however, are in progress for the longer stay of this precious collection in New York.

IN our notice of the early parts of the second volume of Woodwards's *National Architect*, just received, we refer (page 280) to a project therein contained for the building of five small separate houses on an ordinary city corner-lot 25 feet by 100 feet. A project of a somewhat similar character is about to be carried out in the "East End" of Cincinnati by the well-known Emery Brothers of that city, who have just purchased a lot of land, 100 feet on Sycamore Street and 200 feet deep. They propose to improve this property by dividing it lengthwise in the middle by a court 30 feet wide and 200 feet long; the street-end of these two divisions they propose to occupy with small stores or shops,—two on one side of the court, and three on the other,—50 feet deep; on the remaining 150 feet in the rear of the stores they intend to build, on one side of the court, eight dwelling-houses 18 feet 9 inches by 35 feet deep, and, on the other, twelve dwelling-houses 12 feet 6 inches by 35 feet deep. These buildings they propose to rent for fifteen to twenty-five dollars each per month. In the improvement of real estate in our crowded cities, these propositions are worthy of consideration. There is a very large and increasing class of citizens of small incomes to whom an accommodation of this character in the heart of the towns would be of great advantage. If the conditions of life are such that we must be crowded in narrow spaces, independent and respectable homes such as are furnished by these projects are, in some respects, more convenient, perhaps, than apartment-houses.

M. AUGUSTE BARTHOLDI, who was a member of the International Jury at Philadelphia, and who is the projector and designer of the famous bronze statue of "Liberty enlightening the World," has prepared his Report on the Arts in America for the French Section of the Exhibition of 1876. It is mainly devoted to architecture, and in this, as in other respects, it is written in a spirit of conscientious, and not unfriendly criticism. In a somewhat arbitrary manner he divides the history of American architecture into four successive epochs of development. These, in order, are, first, the epoch of wood; second, that of brick and stone; third, that of iron; and, fourth, that of marble, granite, and freestone, "indicating solid and durable opulence asserting itself in sumptuous and lasting edifices." If we were called upon to make a division of this sort, we should be disposed to mark the eras rather by a succession of styles than of materials; for, with the exception of marble and iron, the use of these materials has not been confined to any definite period, and at the present moment as much of our characteristic work is executed in wood and brick as in the other materials which he names. We may more philosophically designate our first period as the Colonial, in which we recognize a reproduction, in wood, brick, and stone, of the characteristic styles of the later Stuart and earlier Georgian dynasties,—a "Queen Anne style," on the whole, made up of slender orders, small mouldings, balustrades, flat arches, small stone work, and other features of the formal and ceremonious period of our forefathers; second, the Grecian, when the only correct style was borrowed by the builders from the publication of Stuart and Revett, and the temples of Attica found themselves transplanted, peristyles and all, into new pastures, there to do domestic service in a strange land; third, the Renaissance according to Paris, whose refined and ample language we trust we have not ceased to quote with increasing knowledge; and, fourth, the Mediæval, transferred direct from our English cousins (and not from

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the French school of Viollet-le-Duc, as our critic states), and still maintained with persistent vigor. And now M. Bartholdi discovers all the styles existing side by side in our great cities, Greek, Roman, Mediæval, Saracenic, Egyptian, Palladian, Anglo-rustic, and what not, — a strange sight to an artist accustomed to behold in his own land but one visible language of art abundant in its resources of expression for all uses, and so refined by the polite culture of the schools that all other languages seem to him barbaric or provincial. Yet he recognizes a tendency to bold and original treatment of those old forms, and admits that the indomitable spirit of invention, which, in the industrial arts, created a triumph for our country at Philadelphia, has given a characteristic color to our eclecticism, and saved us from the weakness and insipidity of mere correctness. "These tendencies," he says, "working in the American mind, cannot fail to lead to great results; for the Americans are adventurous beyond all other people: of course, they make mistakes, as all adventurous spirits sometimes must; but, out of the infinite number of their attempts, some must infallibly succeed, and do honor to their spirit of invention." When our newly established schools of architecture shall have sent forth into the midst of this bold and bustling New World a class of young men accustomed to study, and thoroughly educated in the fundamental principles of art, the next M. Bartholdi who criticises our work will find, doubtless, results infinitely more worthy of commendation.

We regret that the French Government did not include an architect in its commission at the International Exhibition. For after all, M. Bartholdi, though a man of genius and an artist, is not an architect; and his criticism cannot, from the nature of things, have the value of an analysis made by a mind trained in the practice of building, and thoroughly educated in the theory of architecture. The English Commission also failed in this respect. Our architecture has thus lost an admirable opportunity of knowing itself. To this end the report of a foreign architect, expressed with official care, "a Daniel come to judgment," would doubtless have been of very great service, and thrown unexpected light upon our development in this department. It is blame, and not praise, that is most wholesome in our present condition. We need not to be reminded of good qualities which are really good; but qualities which we think good, but which are really bad, would be infinitely benefited by a frank and impartial criticism. Our opinions are too much overshadowed by our own work to enable us to take a just view of our attainments and achievements in architecture. That characteristic quality of boldness and invention of which M. Bartholdi speaks, and to which we had occasion to refer last week, is admirable when restrained by education, but, in our condition of half-education as a profession, is sure to betray us into ungrammatical extravagances. Among ourselves, we see plainly enough the crudities of our neighbors; and they, in turn, like the Pharisee, doubtless thank Heaven that they are not as we are. We have committed ourselves to wood, brick, iron, and stone, more extensively, and with less reserve, than any other nation has done in the same length of time. A professional tour among these crowded monuments of progress by a foreign architect of large experience and trained judgment would be to him, we believe, one of the most interesting revelations ever made by travel; and, if he should give to the world the result of his studies in a candid and kindly spirit, the publication would meet with a great acceptance, certainly on this side of the water, and would be of infinite service to the cause of art. A writer of graphic power with pen and pencil — power such as M. Félix Narjoux, for instance, displayed in his *Journey of an Architect in the North-west of Europe*, lately quoted so largely in these pages — would find in our cities East and West abundant food for comment.

M. Bartholdi's remarks concerning American cabinet-work are discriminating, and worthy of especial note. He says that our wood is well prepared and combined, but that the results indicate a too exclusive use of mechanical contrivances, which lead our cabinet-makers to aim at producing the most striking effects possible by the combination of easily and cheaply worked details. "The parlor-cars of the American railways are the highest expression of this peculiar American style." We cannot but acknowledge this as a most palpable hit. As a rule, our carvers are foreigners, though we are happy to note that the exceptions are growing, and machine-carving doubtless unduly supplants the work of the hand. We have wood pressed, moulded, turned, and tortured into shapes by ingenious patented processes, but nothing approaching a school of carving, save what the enterprising ladies in Cincinnati are developing with happy promise of success. By these processes a conventional scroll of the Louis XIV. style finds itself exactly repeated on the backs of innumerable chairs and sofas of the same pattern, on the heads of countless bedsteads, on the legs of all our pianos, on drawer-pulls and lock furniture sold by the gross, until, wherever we turn, we are reminded that household art has much to undo before it can prevail. In the midst of this baneful abundance, the honest hand-work of our ancestors in the heirloom furniture of the last century becomes doubly precious. Our French critic, however, does not overlook the "happy combination of French and American ideas" produced in the work of such houses as Marcotte, Pottier & Stymus and Herter, and the great influence for good produced in this country by the decorative movement in England. We cannot but avail ourselves of this opportunity to say that the use of Japanese *motifs* in the furniture and ceiling decorations of Herter, and perhaps of one or two other great manufacturers, marks an era in household work of the highest class. The inexhaustible resources and suggestions offered by these ingenious Orientals as regards form and color for decorative work of all kinds are a continual wonder. One who studies them becomes at once enriched. The power of various artistic expression can never fail so long as it can recruit itself from the screens, the fabrics, the vases, the book-prints, and the minor objects of industrial art, produced by this singular nation.

M. BEULÉ ON GREEK POLYCHROMY. — II.

It will not be amiss, first of all, to tell in what condition color has been found on the temples. If the temples are still standing, it is to be looked for in the hollows and undercuttings, which are naturally protected from exposure to weather, on cornices, pediments, triglyphs, beak-mouldings of antæ-capitals. One must climb with a ladder, and study close at hand, with minute attention, all the nooks of the stone or marble in which color may have been sheltered. From smooth walls, columns, flat surfaces, the color, if it ever existed, has naturally fallen off. A slight injury is enough; the color, gradually scaling off, in time disappears altogether. Often chemical decomposition has taken place: perhaps an incrustation has developed of itself: perhaps dust has incrusted the painting: — only a grayish, wrinkled surface is to be seen. But, if this protecting crust is carefully removed with a cutting instrument, the color appears at once, clear, brilliant, and fresh as if applied yesterday: the contact of the air, however, makes it fade and disappear rapidly.

If the temples are overthrown, it is in the earth that we must look for colored fragments. The dampness of the earth preserves the precious remains of painted decoration, and gives them to light in admirable brilliancy. Unluckily, the colors thus brightened, that is, affected by terrestrial salts, are only the sooner destroyed by the light, and disappear very quickly; though stucco, by virtue of its grain, and the thickness of the paint upon it, preserves better than stone the colors in which it has been clothed. It is, then, very important that whoever uncovers a monument or a fragment should note at once the colors of which it bears marks: soon it is too late. For this reason, the testimony of travellers and explorers is precious, and was especially precious formerly, when discoveries were easy and frequent. When painted fragments are taken from the ground, it is impossible to be deceived, so fresh and recognizable is their color: later, mistakes are easy. Concerning monuments which remain standing, it must be granted that contradiction is by no means inevitable [*sic*], because time has changed the colors, and made their traces pale and fugitive. Thus, on the wall of the Theseum, Mr. Semper, one of those who have accepted the theory of polychromy with most exaggeration, has thought he saw blue; and others, yellow. M. Paccard has seen red on the tympanums of the pediments of

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the Parthenon, while I have seen blue. Science can only wait in suspense when testimony is contradictory. We can only accept what is certain and uncontested; later new discoveries will settle debated questions.

With these limitations, let us take the Doric temple, examining it from floor to roof, and assign the colors wherever they have been found. The proofs shall all be borrowed, as is proper, from the temples of the sixth century B.C.

Was the *floor* itself painted? The temple of Ægina offers an example. In the pronaos and in the cella there was a coating of stucco six millimeters thick (two inches and a quarter, say), covered with vermilion. The vermilion was even thicker than the stucco, as if many successive coats had been applied during centuries. It may be supposed, in fact, that it was necessary to repair the injuries of a painted surface which the feet of men frequently trod. On this red ground were there mosaics? This it has been impossible to determine.

The *steps* have not yet shown any trace of color. Nevertheless I can by anticipation suggest the temple of Jupiter Olympius at Agrigentum, in which the rebates of the courses still retain stucco which must formerly have received color.

At the time of Pisistratus the *columns* were painted at Corinth. They still preserve the stucco which clothed the stone; but the color can no longer be determined. It has been assumed that these columns were painted to imitate granite; but this theory, which all the Greek customs refute, was evidently inspired by the influence of the Egyptian system. At Metapontus the columns are covered with yellow stucco, and the color is not applied; it is incorporated in the stucco. At Egina the tint seems also infused into the stucco; but the stucco is thin, and the color very pale, so that it is difficult to make sure of any thing. Its light yellow, however, is very recognizable; and this coincidence with Metapontus has some importance.

The *capital* was painted. Egina favors the supposition; for the capitals were covered with stucco. On this stucco remains a dark shade of yellow ochre, which M. Garnier attributes to a mixture of red and an oxidation of the gilding which relieved the ornaments. Here we have only suppositions; but the singular capitals of the portico at Pæstum are no supposition, where the honeysuckles stand in relief, being protected by a coat of color, while all around them the soft stone of the capital, less protected, was eaten by the salt wind from the sea. It has followed that what formerly was painted is to-day relieved and bears curious testimony to the decoration of the capitals. I look among Greek vases, not for a proof, but for an indication. I see in a vase reproduced by Hittorff analogous motives, — honeysuckles set in scrolls. Those who ascribe an egg moulding to the Doric capital, as M. Garnier has done in his restoration of the temple of Ægina, take for authority the capital of the great tomb at Corneto. But to us, at least for the time being, Etruscan art is not sufficient authority to fill the voids in Greek art. I know that the Ionic order afterwards used these eggs on the torus beneath the cushion of the capital, and by analogy they might be supposed to be on the echinus of the Doric capital. Without judging of their effect, — instinct saying whether or no the eggs would deform the profile of the Doric capital, and change its character, — I content myself with maintaining that no authentic example of such an ornament is to be found on Greek buildings of the sixth century before Christ. There is, on the contrary, an example of honeysuckles alternating with water-lilies, and springing from an elegant scroll.

Did the *abacus* wear a meander, as in following centuries? Proof is lacking; we must wait.

The *architrave* is found at Ægina to be painted, without ornament. Hittorff adduces very fine terra-cottas, friezes of vases, on which are represented the entablatures of temples. Reminiscences of the crowning features of temples have given the motive for the crowning features of vases. Below the frieze, in the part which seems to correspond to the architrave, we see great running scrolls formed of ivy and bay leaves. These terra-cottas, whose ornaments are in relief, do not belong to the archaic epoch; and the ivy, an attribute of Bacchus, has its appropriate place on vases. The induction can hardly be drawn from the frieze of a vase to the frieze of a temple. The scroll-ornaments which M. Garnier supposes in his restoration are likewise borrowed from monuments of a very different kind. I do not say that the architrave cannot have been decorated; nevertheless, the shields which were afterwards hung on it, the inscriptions which were put there, make me think that it remained plain: so important a decorated member would not have been concealed or interrupted. It is certain that as yet nothing has been found on the architraves of the sixth century, but a flat red color.

The *frieze* had its triglyphs painted blue. In all countries, — in Sicily, at Athens, at Ægina, — the testimony of Vitruvius is confirmed by buildings. The old Parthenon has left us triglyphs on which the blue is still to be distinguished. The wall which bars acess to the Acropolis showed visible traces of blue on its triglyphs, where I found it buried under twenty. feet of *débris*. At Ægina, Leake, Cockerell, Blouet, Ottfried Müller, successively saw blue on fragments of triglyphs which they found buried in the soil. Their testimony is unanimous; but the color has since disappeared.

On the band which unites the triglyphs, and which is called the *tænia*, there was red. Leake, Blouet, and Ottfried Müller have verified it by the Temple of Ægina. It no longer exists on the listel of the exterior order; but M. Garnier noticed it on the listel of the architrave of the pronaos running all along the band, with inverted honeysuckles. It is, perhaps, allowable to transfer this decoration from the pronaos to the exterior entablature. The *guttæ*, again, were blue, like the triglyphs.

The *metopes* were sometimes sculptured: in this case the ground was red, as is evident at Selinus. When the metopes were not sculptured, as was more commonly the case, what was their decoration? Was it simply a red color? Or were there put upon this red ground, vigorously opposed to the ground of the triglyphs, painted ornaments, animals, monsters, to justify the Greek name, zoöphorus, of the frieze? I could willingly suppose it; but still the proof is lacking. At least we must bear in mind the white marble slabs slipped into grooves between stone triglyphs, and in temples built entirely in stone. Why seek out a finer, more brilliant material, only to smear it with red? Was it not, rather, in order to put finer painting upon it? The friezes of Sicilian vases which I have just cited have metopes decorated with honeysuckles and complicated scrolls, combined and opposed so as to fill a square. Unhappily the testimony of these vases, I repeat, cannot reasonably be applied to the archaic epoch.

The *cornice* gives us blue on the mutules. This is found constantly in Sicily, at Ægina, and at Athens. Between the mutules was red; and the band beneath them was red. The guttæ were planted on in white marble, or painted yellow, as at Ægina. The corona, of which a fragment has been carried to Munich, was painted red. On this ground was there a honeysuckle, alternately upright and reversed, set on a spiral, and painted green and blue? The position of this fragment, its ornaments, and their color, have been disputed: this point must therefore be left undecided.

The *beak-moulding* of the raking cornice of the pediment, and of the anta-capital, is always ornamented with leaves, alternately red and green, or red and blue, or even, what is yet more archaic, red and brown. These leaves are defined by a white outline, which, in the great ages of art, was gilded; whether they were in more ancient times is not known.

The *pediment* is painted blue, the color of the sky, against which the statues best detach themselves. We have just said that the raking cornice received a decoration analogous to that of the horizontal cornice. But the bed-mould has leaf-ornament of a different form, pointed, and divided by darts. The darts are blue; the leaves, red and green.

The *gutters* which crown the entablatures present magnificent ornaments, especially in Sicily. It is possible that the crowning members were set, or replaced, in the fifth century with the brilliancy and taste of that time. The gutters found in Attica show only olive-leaves and honeysuckle. There are two colors in the terra cotta, — a yellow on a brown.

Finally the *tiles*, the *acroteria*, the *antefixæ*, every thing which was ordinarily of terra-cotta, was painted in the archaic epoch. Tiles of yellow and of bright red color have been found at Ægina, which suggest a sort of design on the roofs. In Sicily we find tiles painted above and beneath; we may then believe that the rafters of the gabled roofs were exposed on the interiors as in basilicas. The antefixæ bore a honeysuckle on a scroll, or Gorgon heads showing their

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tongues, veritable monsters of strange character, which give a high idea of ceramic art from the sixth century, and prove what progress the invention of Dibutades had made. These Gorgons' heads have been found in the Acropolis: they belonged to the old temples of Athens.

AMERICAN VERNACULAR ARCHITECTURE.[1]

MR. WOODWARD'S architectural publications have, we believe, had a very large circulation, especially in the latitude of New York, and we do not doubt have had no unimportant influence upon builders' work in those regions. We have received the first five parts out of the twenty-four which are to constitute the second volume of his "National Architect." We have not seen the first volume, which, according to the publishers' notice, presents a thousand designs "in a shape to be placed at once in the hands of a builder for execution," and we are not aware to what extent this incredible promise has been fulfilled. But Mr. Woodward's enterprising advertisements are familiar to us all, and doubtless they have been the means of procuring a very large sale. The character of a work so vigorously disseminated becomes, therefore, a matter of considerable importance.

Judging from the appearance of the second volume, so far as received, the mechanical execution of the work is excellent, the plans are ingenious, compact, and economical, and the elevations are such as constitute the better sort of builders' work rendered familiar to us by countless repetitions in all parts of the country. They are, in short, the American vernacular architecture: on a level with the public demand, — no better and no worse. Any one who desires to know what the "American style" is will find it, if anywhere, handsomely set forth in this book. We do not think, however, that it competes in any respect with the work of architects. The business of the book apparently is to supply ideas concerning buildings: the function of the architect is to give form to the especial requirements of his client, to adjust the building to the site, to study the aspect and the grades; to give the structure all the grace, character, individuality, of which it is capable within the financial limits imposed; to meet all the conditions of ventilation, drainage, heating, plumbing, according to the best available science; to prepare detail plans and specifications; to obtain competitive estimates; to prepare contracts; to direct the execution; to decorate and complete — in fine, to create a work of art. His business is to improve, and not to flatter, the taste of his client. He creates new things not for the sake of their novelty, but by necessity, because there is something, some element in every problem presented for his study, which, in combination with the rest, is without precedent. Hence the infinite variety of artistic work. In the presence of books of this character it seems necessary to recall why architects exist at all.

Architecture can only be made easy by mechanical processes out of which must come mechanical results. Within these limits, and judging, as we said, from the portion of his work now lying before us, Mr. Woodward's publication is one of the best of its kind. It is not instructive for the architect as an artist and man of science, but for the builder who builds without an architect it must be full of inspiration.

There are two studies, not without interest, of five houses built upon one city corner lot twenty-five by one hundred feet. These houses are twenty-five feet deep by nineteen to twenty-two feet wide, and with this area, in a height of four stories, with basement and mansard roof, manage to provide in each a kitchen, parlor, dining-room, three chambers, eight bed-rooms, a "boudoir," a bath-room, dressing-room, two pantries, a store-room, and a fair array of closets. Of course these rooms are on a small scale, the largest having but fourteen by eighteen and a half feet area (or in the corner house fourteen by twenty); but they are all there, and very cleverly grouped indeed. Concerning the elevations it may be said that they are without genius, with no touch of originality, but safe, and at least as good as the average of New York city houses. These designs are further illustrated by three or four quarto pages of details.

The text connected with these two designs is, in full, as follows:

FIVE HOUSES ON ONE CITY LOT, 25 X 100 FEET.

In presenting this design in the shape it is, several objects are accomplished.

The front elevation is an elevation not only for five houses having a depth of twenty-five feet, but for five houses having any depth required, and any plan of the same width may be adapted to each of the five houses in the elevation.

The elevation also may be adapted to a variety of purposes by changes in the basement story, and be made useful as a public building, library, hall, school, or hotel, being then treated as one entire building. [The Italics are our own.]

This design, therefore, in the hands of an ingenious architect or builder, supplies the suggestions for a large number of distinct buildings, giving one single house twenty feet front; two houses, three houses, four houses, five houses, and one entire building for any purpose.

This design for five independent small houses, to be built on one corner lot twenty-five by one hundred feet, has frequently been carried out of late years in New York, and has accommodated a class unable to rent large houses, and unwilling to adopt the tenement and New York "flat systems." The independent house will always command owners or tenants not familiar with the "apartment" system; and the great objection to the arbitrary size of a New York city lot is, that, without great loss, it cannot be made available in the construction of houses of moderate capacity.

There is an additional page of text suggesting how this design can be converted into an apartment house.

These remarks do not throw any light upon the plans, which are set forth by engravings sufficiently clear and graphic; but they are worth quoting for the sake of the insight they afford into the true spirit of machine architecture. An elevation so elastic in its capacities would be well worth a careful analysis, if such process would seem to promise any revelation beyond the familiar mysteries of the T square and drawing-board.

The other designs in the numbers before us are for country houses, varying, it is said, in cost from $3,000 to $8,500. The plans are, without exception, excellent for common usage, although they do not, of course, contemplate any exceptional conditions of grade and exposure. But the elevations, as we have intimated, are commonplace, and the estimates of cost presented in each case seem certainly, in the present condition of the market, more honest than is usual in such publications.

It is proper to add, that, although the prospectus promises "complete working drawings and details of the original designs," the present volume so far does not fulfil the just expectation of the purchaser in this respect; for an occasional page of details is not a sufficient justification. The price of this work is fifty cents for each number, and the publishers offer special terms to old subscribers and to clubs.

Considering the large circulation and the apparent influence of these publications, we shall not fail to watch the development of the present volume with great interest; and, considering its undeniably representative character, we shall be more than pleased to be able to give expression in these pages to our satisfaction at any improvement in its artistic part.

We have also received the first parts of a new book by the same author, on alphabets,[1] which is offered at the same terms.

[1] Woodward's National Architect. Vol. II. Containing original designs, plans, and details, to working scale, for City and Country Houses. By Geo. E. Woodward, Architect. Geo. E. Woodward, Publisher and Importer. Copyright, 1877.

THE ILLUSTRATIONS.

THE LENOX LIBRARY, NEW YORK, N.Y. MR. R. M. HUNT ARCHITECT.

(73 Coal and Iron Exchange Building, New York.)

THE library building occupies a commanding site on Fifth Avenue, between 70th and 71st Streets. It is 192 feet in length parallel to the avenue, and 114 feet deep on each street, with an entrance court between the north and south wings 42 feet in depth from the front line, and 96 feet long. The main approach is from Fifth Avenue, through two massive gateways and the court. The service entrances are in the rear of the building, and communicate with 70th and 71st Streets by a passage-way which extends from street to street. The principal entrance-door opens into the vestibule, on first story, 24′ x 96′, from which all portions of the building are reached. It is in immediate communication at the south end with the first story library, or reading-room; at the north end with the similar room in that wing; in front facing the entrance with the janitor's office, cloak and retiring rooms; and, at the north and south ends, with the main stairs leading to the second story. This vestibule, which may be used as a gallery of sculpture, is well lighted from the court by two large windows, and also from the stair-halls at each side. The floor is laid in white marble tiles; and the walls are skirted with a dove-colored marble base. The first-story library, or reading-room, and the room at the north end of the vestibule, are each 108 feet long, 30 feet wide, and have six recesses 6′ x 24′, at each, or opposite each, side window. These rooms are 24 feet high, having level ceilings handsomely panelled and corniced. The windows are ten feet from the floor, to secure a large amount of wall room. The main stairs at the north and south ends of the vestibule, standing on the first story, lead by an easy ascent to the mezzanine or half story, and to the second-story landing. The south stairs do not continue higher than this, while the north stairs reach to the attic, or third-story landing. These stairs are of stone, and of remarkable construction. The balustrades are of iron scroll-work of fine workmanship. The stone platform-landings are supported by arches springing from carved stone corbels. The mezzanine or half story is laid out in apartments for the superintendent, with office, parlor, dining-room, a full suite of sleeping and service rooms with ordinary conveniences. From the second-story landings two doors open into the principal gallery, 24 feet wide and 96 feet long, parallel to the avenue. Three large windows open on the balcony overlooking the court, the avenue, and the park. The sides of the room are divided by five arcades, resting on imposts or piers which are decorated with niches, pilasters, etc. The ceiling has deep panels or caissons between the transoms resting on and supported by the pilasters. The walls are wainscoted in oak to the height of the niches. At the south end of this gallery

[1] Woodward's Ornamental and Fancy Alphabets, Monograms, and Titles. W. H. Steele & Co., 7 Murray Street, New York. Copyright, 1877.

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is the second-story library, or reading-room, at the north end the similar room in that wing, and at the middle is the entrance to the picture-gallery. The reading-room and north rooom are both of the same dimensions, 30′ x 108′, with six recesses, each 6′ x 24′, at each, or opposite each, side window. These rooms have lofty vaulted ceilings 40 feet high in the middle, 35 feet high at the sides. The cornices are simply moulded, admitting the ultimate decoration of the ceilings in imitation of a *tenture*. The recesses are arched 30 feet high, ornamented with archivolts springing from the moulded imposts of piers. The picture-gallery 40′ x 50′ is well lighted from above by three large skylights, the ceiling gradually inclining downward from these to the cornice, which is carried around four sides of the room without breaks. The walls are skirted with a heavy dark wainscoting, the cap of which may serve as a rest for the lowest row of paintings: from this to the cornice the walls are perfectly plain. At the head of the main stairs at the north side is the door leading to the attic, or third-story gallery 24′ x 96′. This gallery may be used for the exhibition of paintings, etc., on three sides; the fourth being taken up by the windows, and a broad balcony extending nearly the whole length of the room, partly for access to the windows, which command a very extensive view, but also for viewing paintings or other objects arranged on the opposite side of the room. From this room access is also had to the roof and the rooms under it, including the tank-room, in which is to be maintained a supply of water sufficient for all the service of the building above the basement. The basement extends under the whole of the building, and will be employed for the storage of books, etc., boiler-room, heating coils, and ventilation conduits. In the boiler-room are four large boilers, the fire-pump, feed-tank, and other appurtenances of the steam and water works. The coal vault is to be under the rear passage in convenient proximity to the boilers. The heating apparatus is intended to work with the ventilation in such a manner as to secure a comfortable degree of heat, and at the same time change the air in the rooms once each half-hour, if necessary. The steam coils are generally placed in brick chambers in the basement; and the steam-pipes and warm-air dampers are so arranged, that the engineer has the control of the heating of the whole building without being compelled to leave the basement. The principal rooms of the building are in communication with each other and with the superintendent's office by speaking-tubes. From this office, orders can also be given directly to the janitor or engineer by the same means. The library-rooms in the south wing communicate directly by circular stairs of stone in the piers on both sides, and have been fitted with presses or bookcases of iron, the capacity of which for immediate use will accommodate not less than eighty thousand volumes. These presses are arranged in two tiers, with galleries, for convenience of access to which additional staircases of iron have been placed in two of the recesses on each floor. The corresponding rooms in the north wing and galleries of the centre will be devoted to the arrangement for exhibition and use of those various collections of rare and curious works, objects of art, etc., which require extended space, and special protection against loss or injury.

TRAJAN'S ARCH AT BENEVENTO, ITALY.

Trajan's Arch, or the *Porta Aurea* as it is called, is one of the most beautiful and best preserved, as well as among the less well-known, Roman structures in Italy. It was built about 114 A.D. in honor of the completion of a new road to Brundisium, and was dedicated to the Emperor Trajan by the Roman Senate and people. It is built of marble imported from Greece. It is 53′ in height, and is pierced by an archway which is 29′ high. It was formerly crowned by a statue of the emperor upon a quadriga. Both faces of the arch, as well as the walls of the archway, are covered with sculptures in relief, the character and present condition of which are sufficiently indicated in the illustration, taken from Bourgerel's *Fragments d'Architecture et de Sculpture*, which represents the outer face. In the spandrels of the arch are two recumbent figures, thought to represent the Danube and the Euphrates, or possibly the Rhine. The frieze is occupied by a triumphal procession, representing Trajan's triumph over the Germanic tribes. On the attic, at the left of the inscription, the gods are determining that Nerva shall adopt Trajan; while on the right, the conquered King of Dacia, Decebalus, kneels at the emperor's feet. The relief in the upper part of the left-hand wall-space again represents Trajan triumphing over Dacia; while below, Armenia is constituted a Roman province. The corresponding reliefs on the right are the marriage of Hadrian and Sabina, and Trajan receiving an Oriental ambassador.

PAPERS RELATING TO CHEAP FIRE-PROOF HOUSES IN CHICAGO.

DESCRIPTION OF MODEL FIRE-PROOF HOUSES ERECTED FOR MR. SYDNEY MYERS, ON SACRAMENTO AVENUE, CHICAGO.

Foundations. — Stone, laid in concrete.

Walls. — Brick; 14 inches thick in lower story, 10 inches thick above, built with a 2-inch hollow space, but made solid and corbelled out at each story to receive beams.

Beams and Rafters. — Of wood.

Smoke-Flues. — Lined with pipe of burnt clay.

Ceilings. — Concreted one and one-half inches thick below floor-beams.

Floors. — Smoothed boards on beams, stripped with bevelled strips one and one-quarter inches sloping to five-eighths wide, one and one-half inches thick; filled with concrete between strips; and covered with good pine flooring-boards.

Roofs. — Smoothed boards nailed on rafters; strips same as for floors; concrete between strips one and one-half inches thick, then covered with flooring-boards, and over all tinned and painted.

Walls. — Best three-coat work and hard finish; plaster laid on the brick without lath or furring.

Drainage. — Drain-pipes under basement-floors both to the front and rear.

Water. — City water has been introduced, and there is a bath-tub in second story, and sinks in kitchen and laundry.

Steps. — The front-steps are of Lemont marble; back-steps of brick stuccoed with Portland cement. All stairs inside are built of brick, and covered with Portland cement, and prepared to receive carpets. Grates and marble mantelpieces in front-parlors.

Walks. — The sidewalks are of Portland cement; walks in back-yards of plank.

Fences. — Of planed boards, painted with fire-proof paint. Park fences in front to protect trees and grass.

Yards. — All neatly graded and sodded.

Paint. — Parti-colored inside and outside.

Cornices. — Cornices of brick, laid with projections, and painted to contrast with face of walls.

Partitions. — All partitions are either of Loring's terra-cotta brick (about two-thirds the weight of Chicago brick), or of concrete laid up in supports of telegraph-wire.

Anchors. — All walls are thoroughly anchored, and hollow brick walls tied with wrought iron anchors one-half inch wide and one-fourth inch thick, set every five courses, and three feet apart horizontally.

Concrete. — All the concrete used for ceilings, roofs, floors, and partitions, is composed of one-half cinders, one-fourth mortar, and one-fourth plaster-of-Paris.

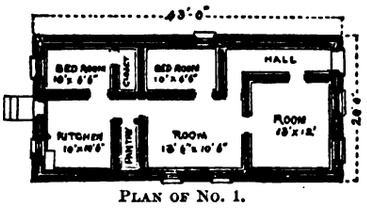
All the ceilings in the Sacramento-street houses are made on James John's patent, and supported from No. 17 galvanized iron wire, attached to tenpenny nails driven into the beams four inches apart.

Specimens of ceilings supported on bevelled strips and split lath have been tested, and are found to resist fire. The cost of John's ceiling, including hard finish, is from seventy to eighty cents per square yard. The substitute costs about forty cents per square yard, and is given to the free use of the public. Floor and roof concreting costs about twenty cents per square yard.

No. 1.
FIRST PRIZE. — COST $1,200.

Cost. — Four small houses of substantially the same construction have been erected near the North-western Car Shops, north-west of Central Park, two stories high, tin and concrete roofs, with lots neatly graded, fenced, and sodded, with cisterns, etc., and are offered for sale for $1,800, — $500 cash, and the remainder in easy payments extending through five years or more.

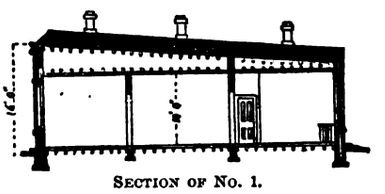
The houses on Sacramento Avenue are offered for sale for $3,000 each, including the lots and appurtenances, — $750 cash, and balance on easy payments. One-half may remain on mortgage as long as desired, if interest is promptly paid.



PLAN OF No. 1.

Location. — The location of all these buildings is on high ground, within ten or fifteen minutes' walk of the West Side Parks, a very considerable portion of which are improved with walks, drives, ponds with boats, fountains, etc.

Mr. A. J. Smith, architect, 77 Clark Street, was the successful competitor for the prize of $1,000; and these buildings were all erected under his immediate supervision and upon the mode of construction contained in his specifications.



SECTION OF No. 1.

Mr. Thomas R. Jackson, architect, of No. 257 Broadway, New York, has been the consulting architect, and was employed to visit the principal Eastern cities, and decide upon the possibilities before the prize was offered, and aided the Committee of Award in analyzing and com-

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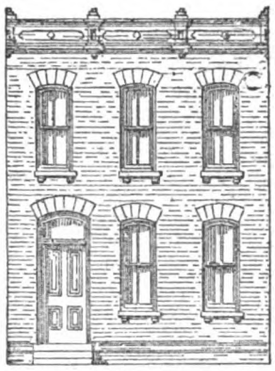
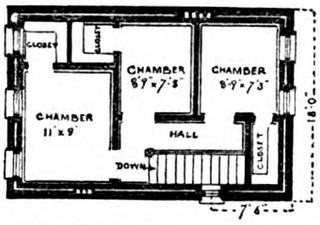
piling the information and suggestions contained in the thirty sets of plans and specifications submitted in competition for the prize of $1,000.

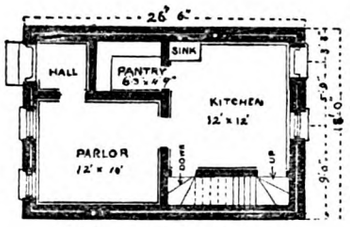
Objects in View. — To secure an approximately fire-proof building within easy financial reach of all industrious and frugal people, and thereby to demonstrate the practicability



No. 2.
PRIZE DWELLING. — COST $1,700.

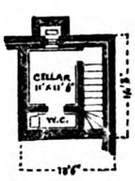


NO. 2. — SECOND FLOOR PLAN.

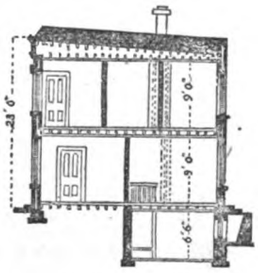


NO. 2. — FIRST FLOOR PLAN.

of rendering all new buildings practically fire-proof at reasonable cost. The *percentage* of additional cost is, of course, greater on small buildings than on larger and more pretentious ones as to size and finish; but it is the opinion of both architects that well-protected smoke-flues, hollow walls, and concreted roofs, floors, and ceilings, can be secured in the erection of the *average* dwelling at not exceeding eight per cent additional cost over the cost of an honestly constructed building with brick walls, but with inflammable roof, and unprotected beams and rafters.



NO. 2. — CELLAR PLAN.



NO. 2. — SECTION.

Results. — If the results of these efforts to prevent great conflagrations by eliciting practical suggestions for the more substantial building of cities and towns, shall be in a moderate degree successful, the originators of this special enterprise will feel fully repaid for some expenditure of time and means.

REPORT OF THE EXPERT COMMITTEE ON AWARDS.

CHICAGO, Aug. 16, 1875.

SYDNEY MYERS, Esq., *Manager Merchants', Farmers', and Mechanics' Savings Bank.*

Dear Sir, — The undersigned, your committee appointed to examine the plans and specifications submitted in competition for the prize of one thousand dollars ($1,000), offered by you for the best plans for an approximately fire-proof dwelling, beg to report as follows: —

After a thorough and complete examination of the various plans submitted, the award was made on the first day of February, 1875, to Mr. A. J. Smith, architect, Chicago, conditioned upon the faithful performance on his part of all the stipulations contained in your circular, involving the erection by him of a house constructed substantially upon plan submitted, said house to be tested by your committee, especially with reference to its fire-proof qualities; but its cost, construction, symmetry, and convenience to be also considered.

Having received notice that a block of four houses had been constructed on Sacramento Avenue, according to his specifications, under the supervision of Mr. Smith, we proceeded to the locality Saturday afternoon, the 14th inst., where we found the south one of the block furnished for occupancy, and exceedingly desirable as to capacity, neatness, and symmetry, as well as in respect to substantial qualities in the construction.

These houses have two stories and basement; stone front-steps, and steps to basement; hollow brick walls; Portland cement stairs inside, suppported on brick, and the same description of steps to the yard, both from the principal floor and from the basement; all partitions are of brick or concrete, and all timbers perfectly protected with the same materials; roofs covered with concrete, and then tinned and painted; all smoke-flues are lined throughout with burnt clay-pipe; the window-sills are of stone; and the window-caps of terra-cotta.

The houses are complete in all their details, with trees and grass in front enclosure, and sidewalk of Portland cement, and within every thing in order ready for housekeeping, including gas and water pipes, sinks, bath-tub, etc.; the yard, with neat, painted fences, and sodded, having all necessary appurtenances, even to hooks ready for the clothes-lines; and, as the cost is an important element in such experiments, we will add that the houses and lots are being sold for three thousand dollars ($3,000) each. Terms, one-fourth cash, and the remainder in easy payments. These houses cost, without the appurtenances, about $2,000 each.

We then proceeded to the north house, which was in an unfinished state, ready for the test. This building contained representative furniture, made of pine, equivalent to that in the furnished house, besides which the floors were thickly strewn with shavings; and, the further to facilitate a rapid and intense heat, the windows were left open, furnishing a perfect draught of air through the building.

The fire was started at five o'clock; and, after it had nearly burned itself out, water was introduced by fire-marshal Benner, and thrown against the walls and ceilings from an engine, to ascertain the effect of water thrown on the material when heated.

The result of this test was most gratifying to your committee, satisfying them that the building was, indeed, all that had been claimed for it, and entitling Mr. Smith to the full benefit of the award.

The only damage we were able to discover as the result of the test consisted in the falling of some of the rough coat of mortar, the partial burning of the window-casings, and discoloring of the window-caps by smoke.

In addition to the test made to the building itself, we also tested two sectional buildings, intended to show more particularly the construction of the roof and ceiling, of which there were two kinds, — one known as John's patent ceiling, with wires stretched at intervals of four inches to form the support of the whole mass of mortar and concrete; while the other, an arrangement of your own, in which the support for the mortar was formed by nailing wood lath to bevelled strips of wood on the under side of the joists, so that, when the concrete is filled in on top, it forms a self-supporting arch.

Both these sections were subjected to an intense heat for three-fourths of an hour, when water was applied, and they were found to be in apparently as good condition as before the test.

In conclusion, we repeat that the test was in every manner satisfactory to us as fully conforming to the requirements contained in your circular.

We cannot close this report without expressing our appreciation of the great work you have accomplished in demonstrating not only to Chicago, but to the whole country, that good, pleasant, and indestructible houses can be constructed at a moderate cost, and we hope soon to see them replace the unsightly, unhealthy, and unsafe buildings so much in use at this time.

Very respectfully yours,
LOUIS WAHL,
Representing Board of Public Works,
(per REDMOND PRINDIVILLE, *Pres't Board of Public Works*).
CHAS. W. DREW,
Representing the Chicago Board of Underwriters.
N. S. BOUTON,
Representing the Citizens' Association.
BEN. C. MILLER,
Representing the Board of Health of Chicago.
AMOS GRANNIS, *Representing Builders.*

SUPPLEMENTARY REPORT.

CHICAGO, Aug. 16, 1875.

We, the undersigned, were present at the fire-test described in the foregoing report of the awarding committee, and, having carefully examined the buildings described, take great pleasure in adding our testimony as to the correctness of the facts stated in the report, and desire to signify our concurrence in the same, and our high appreciation of the useful results of these efforts to bring substantial homes within the reach of all classes of our people, and the introduction of a method of building, which, if generally practised, will soon render our towns and cities exempt from great conflagrations, and, by reason of securing safer investments, bring more capital to our cities for investment for the benefit of *all* classes.

H. D. COLVIN, *Mayor.*
R. PRINDIVILLE.
J. K. THOMPSON, *Board of Public Works.*
M. B. BAILEY, *Inspector of Buildings.*
M. BENNER, *Fire-Marshal.*

NOTICE.

M. F. AND F. SAVINGS BANK.

This institution is now prepared to loan money for the erection of buildings within the limits of the city of Chicago. Preference will be given to depositors. Applications will only be entertained from those who have unencumbered lots of satisfactory value, on which they propose to erect buildings; and the money will be advanced as the buildings progress.

The construction recommended is illustrated in the model houses

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on Sacramento Avenue, which have been thoroughly tested as to their fire-proof qualities, and in the special models of ceiling, roof, and floors, near the same.

CONSTRUCTION RECOMMENDED.

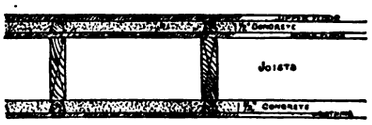
1. Fire laws of the city to be complied with.
2. Exterior walls to be hollow "between joists."
3. No furring or lathing allowed on exterior walls.
4. Flue-pipes of soft burnt clay to be used.
5. Ceilings to be covered with 1½ inches of concrete.
6. Floors to be protected underneath with 1½ inches of concrete.
7. Roofs to be protected with 1½ inches of concrete.

This bank has adopted a rule which will be strictly adhered to in future, — that none of its funds will be loaned for the erection of new buildings in the city of Chicago, unless at least the *first, fifth, sixth,* and *seventh* of the points of construction above given are applied.

SYDNEY MYERS, *Manager.*

CHICAGO, Aug. 16, 1875.

[Of course, the most important point in this system of fire-proof work is the method of rendering a construction of common floor joists or rafters practicably incombustible. The annexed diagram will sufficiently explain the contrivance



SECTION OF FIRE-PROOF FLOOR.

adopted. The roofs are treated in the same manner. The concrete is made as follows: ½ common cinders from rolling mills, screened; ¼ mortar; ¼ plaster of paris; mixed to the consistency of *mush*, poured in buckets on the rough flooring or laths, and tempered down with hose: this composition, it is said, will dry in twenty-four hours, "forming a hard, dry, white stone." — ED.]

ART IN SMALL MATTERS.

A RECENT article in the *American Architect and Building News*, upon "The Personal Relation of Architect and Client," suggests no little food for thought. It cannot be denied that the existence of any thing like a personal relationship between the architect and his client is, to a very great degree, either entirely overlooked or ignored by the average public. The first definition of the word "architect" which passes current is "a man who plans houses;" and what *raison d'être* there is for an architect, what excuse for his existence, while the builder still lives (who also "plans houses") is a problem remaining unsolved in the minds of many people. Exceptions to this only too prevalent notion exist in cases of the erection of large buildings, churches, insurance blocks, State capitols, and the like, when the usefulness of an architect is acknowledged. The element of design as one of the essentials to professional excellence is frequently passed over, save in instances similar to those above cited. As in many other things the smaller affairs are swallowed up in the greater, so in architecture we frequently find a belief that the latter alone should engage the study and close application of the projector.

It was the fortune of the writer to be present at a recent meeting of the members of a certain district where it was proposed to erect a schoolhouse. Plans had been submitted by an architect, and favorably considered by the committee. A competitor was in the field; and finally a motion was made to refer the selection of design and plans to a committee of architects, and thus decide a knotty point. Instead, however, of agreeing to this proper arbitration, an additional building committee of five men was chosen, on the principle, we presume, of safety in a multitude of counsellors; the election being preceded by remarks to the effect that a committee from the district would know more about the schoolhouse than an architect or any number of architects. Here the professional man was in the way, he was an expensive luxury; a schoolhouse was but a small matter, and the professional element, whether of design, or plan, or study, or thought, was waived aside. Of course "district committees" are not fair examples of the people with whom the architect comes in contact — and "contact" strictly describes his relations with some clients. Church committees are not always the most affable, particularly when time is limited; and in intercourse with them, or with building committees of whatever class, is brought into requisition one of those personal qualities which, in an architect, does much to stamp him with success; we mean his power of adapting himself to the caprices and whims of different people.

If "manners make the man," as the adage has it, in no profession do they have more influence than in that of architecture. A veneering, although in reality a sham, can be tolerated in some instances; but not a thin coating of impressive manner and a resort to thinner subterfuge, as in the case of the architect who hung his office-walls with scriptural texts to impress admirers of church work with his personal morality. Men who do so are doomed to live their little lives, accomplishing little.

It is not necessary that artistic feeling should have always a large field for its display; and in the lesser works and smaller commissions intrusted as much art may find expression as in the costly façades of more pretentious structures. A fatal mistake is only too often made in the undue haste in which a building project is carried out; more particularly, perhaps, in the erection of private dwellings. In this country, the building of a house is not, as a general rule, attended with that importance and peculiar interest of the client which are elsewhere evident, and there is a vast distinction between a "house" and a "home." An Englishman, for example, makes a home of his house, and in it sets up his Lares and Penates with a view to their guardianship for more than a twelvemonth; but American household gods are peripatetic, and a new house is had, and household ties, whatever they may be, are quickly severed at the option of the head of the family.

It is acknowledged that no two of the human species are precisely alike. This law in nature has not a counterpart in architecture; in fact, the tendency is strongly in the opposite direction, morbidly so, to the exclusion of individuality in design and arrangement of dwellings. House plans are, it is true, free from any thing like a copyright system; but their reproduction is due, however, not so much to their esteemed worth, in many instances, as to the fact that cheapness is an uppermost consideration.

It is with genuine pleasure that we observe a brick and light stone interloper upon the monotonous solemnity of brown-stone fronts, which fashion rather than a love of street-architecture has seen fit to erect upon eligible city thoroughfares. These oases in the deserts of sandstone façades are truly refreshing; and it is a good omen that many of the more recently laid-out avenues in our cities are being shorn of the custom which established long rows of blocks uniform in design as the proper adornment for their sides.

The picturesque treatment of a few houses upon a street may give it an entirely different aspect, not only by breaking that inevitable sky-line, about which a noted authority discourses so frequently, but by means of the color-contrasts possible in building material, which, although a comparatively small matter in itself, may carry no little weight with it.

The gradually increasing demand in this country for brick of moulded and ornamental patterns has almost placed this material in a new light. Its capabilities are unquestionably increased. The brick dwelling of twenty years ago is in great contrast to that of to-day wherein moulded brick have been judiciously and artistically introduced. There is art in laying brick. Effectiveness can be gained by brick laid in patterns; but one pattern is not by any means every pattern. The combination of several moulds, as in string-courses, can bring about good results or poor results; and upon the proper handling depends much of the general expression of the completed work. In cornices, as well as for the production of diaper patterns, these moulds prove invaluable; and the much-used and much-abused "dogtooth" has now to face a whole army of rivals.

While speaking of color-contrasts, a word is pertinent concerning the new departure in the painting of country houses, which finds favor in the eyes of the public. We refer to the use of Indian red and kindred colors in place of the drabs and grays so universally popular. This change offers a good example of the law of circularity, by means of which the red paint of our forefathers is brought into vogue again. Of course "red" is a very comprehensive term; but in the old gambrel-roof days the painted farmhouses of the country took to themselves a sturdy tone of color, which, almost unchanged to-day, offers a good basis for the coat-work of more expensive dwellings.

It may possibly be a yearning for things old which has recalled to our windows the small "lights" of other days, which, but a few years ago, shrank into insignificance beside the costly dimensions of plate-glass; or the adoption may instance another example of the great law above referred to: at all events, the re-instatement in favor has been most effective, and when rightly introduced, the small lights overthrow the objection frequently urged against them of obstructing the view from the window, and by their use a picturesqueness of expression is gained.

A good example of the "*ars celare artem*" in what might ordinarily pass for a small matter was seen the other day in a finely-executed piece of light stone carving. The carving was rich foliated work, extending round the three sides of a boldly-projecting chimney which ran from floor to ceiling in a broad and spacious hall. Upon the carved course was seen an industrious food-seeking bird pecking away among the leaves. He seemed to be there by accident, and aside from the skill of the execution, and the realism of the action and attitude of the bird, the art consisted in the position he occupied. It was not midway on the front of the chimney, it was not a mathematically-measured point, it was not a precise distance; there was no thought as to whether the object was equally balanced with any thing else: the bird was simply represented as though of his own free will he had flown to his perch among the stony leaves. In symbolic sculpture and carving, instances of much happy thought are frequently met, and under the carver's tool many a song is sung and many a story told. It is a delicate

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example of tender thought in the architect, who, in the carved capitals of his chancel-columns, introduces with a pleasing reality the plants and the flowers which are wont to lift their heads in the vicinity of whatever country churches he builds.

CHETWOOD.

NOTES AND CLIPPINGS.

GOVERNMENT BUILDING AT THE CENTENNIAL. — District Attorney Valentine has been instructed by the Secretary of the Treasury to accept the sum of $938.18 in full settlement and satisfaction of the claim of the United States against the Centennial Board of Finance on account of the destruction of the Laboratory Building at Fairmount Park. This was the amount offered in compromise.

A QUICKSAND FOUNDATION. — The big pumping engine of the Providence (R.I.) water-works has broken down through its being placed over a bed of quicksand. The building still continues to settle; and it is understood, that, in view of this fact, the makers of the engine decline to repair and guarantee it. The building and engine cost $250,000.

THE OLD NEW YORK POST-OFFICE. — In making the necessary alterations, the lessees have discovered that the roof of the building is apparently as strong now as it was one hundred and twenty-five years ago. All the shingles and beams are of oak, and were originally hewn out with the broad-axe.

DESTRUCTION OF THE RAILROAD BRIDGE AT OMAHA. — Two spans of the Missouri River bridge at Omaha, 250′ each in length, were blown down, and almost wholly destroyed, during a violent storm, Aug. 25. The storm was from the north, and wrenched 500′ of the bridge from its connections, and hurled it into the river. The dismantled piers, so far as can be ascertained, are uninjured, as also the remainder of the bridge, 9 spans in length. The general opinion seems to be, that the accident was caused by a cyclone. The loss is estimated at about $350,000. It will probably take from two to three months to rebuild the structure. This bridge which connects Omaha and Council Bluffs is 2,750′ in length between the abutments, and has 11 spans. It rests on piers, each consisting of two hollow columns of wrought iron 1¼″ thick and 8½′ in diameter, which are sunk to the bed-rock of the river, in one case 82′, and filled with concrete and masonry. The bridge, which is 50′ above high-water mark, has a railroad-track and accommodations for horse-cars and ordinary travel.

THE OHIO COAL-FIELD. — Ohio's coal-field is a district 100 miles square, including the counties of Athens, Perry, and Hocking. This district has twenty-two feet of solid coal in five seams. The great vein is in places twelve feet thick, and nowhere less than six feet. Mingled among the coal-beds are inexhaustible beds of iron. The thickest is five feet deep at the outcrop; the thinnest, in places, sinks to six inches. But the thickness of neither seam is quite persistent: there are "waves" from time to time, which narrow the seam. The coal, on the contrary, may be said to run from hill to hill with perfect uniformity. Limestone is also present in great quantities.

AN INDIAN MOUND IN TEXAS. — The Corpus Christi (Texas) *Times* says that a mile or so from the ferry at Sharpsburg may be seen a round hill, forty or fifty feet high and a quarter of a mile in diameter. Though it is situated in a flat prairie, composed of black tenacious soil, it is itself formed of fine drifting sand; the top is hollowed out like a huge saucer. Indian spear and arrow heads, cut with a deal of patient and not unskilful work from flint rock, fragments of Indian pottery, and different kinds of vessels of variegated colors, are quite numerous. Here and there are human bones, doubtless belonging to Indian warriors; and recently the back-bone and skull of a skeleton have been discovered.

THE POUGHKEEPSIE BRIDGE. — The first caisson of the Poughkeepsie Bridge is now resting upon a firm foundation one hundred and ten feet below high-water mark, and the concrete to support the masonry is rapidly placed in it. A large force of men is at work; and granite abutments on two caissons will be built twenty feet above high-water mark before ice appears.

ARCHITECTURAL ETCHINGS. — M. Brunet Debaines, the distinguished etcher, has been engaged to prepare a series of six etchings, depicting the following scenes in London: The Interior of the Temple Church; the Fountain Court, Temple; Lincoln's Inn Fields; St. Paul's Cathedral from the river; Corn Barges on the Thames; and Temple Bar.

THE CATHEDRAL AT FLORENCE. — The façade of the duomo of Florence is at last being carried out, and after the designs of De Fabris. The white marble used is from Serraoezza, the green and red from Prato and Serfalco (near Sienna). Subscription-papers are nailed against the staging, and show many names, several for four thousand francs and over; while great numbers of weekly donations of twenty centimes each are collected from poorer subscribers.

THE CATHEDRAL OF NÎMES. — The Cathedral of Nîmes is to be restored, and 50,000 francs have been provided for the purpose. All who know this building — a monument showing the transition from the Romanesqe to the early French Gothic — will agree that but little can be effected with the sum provided.

STRASBOURG CATHEDRAL. — The restoration of the Strasbourg minster is being diligently prosecuted. Behind immense stagings and curtains the painter Steinle is working on the frescos of the choir. The bronze portals will soon be placed in position.

FORTS AND FORTIFICATIONS IN GERMANY. — Great efforts are being made to complete as rapidly as possible the works of the second as well as of the first line of German fortresses. The new forts on the left bank of the Rhine at Cologne, which as originally intended were not to be finished before the end of next year, are already approaching completion, and will be ready to be occupied by their garrisons during the course of the present summer. The girdle of detached works round the fortress is to be completed by forts on the right bank of the river. Plans and designs for these have been drawn up, and contracts for their execution entered into; but the work is to extend over four years. When completed, Cologne will be one of the strongest of German fortresses. At Metz, the fort built since the late war at Woippy, and named by the emperor after his minister of war, Gen. Von Kamecke, has been handed over to the engineers, and armed with guns of large calibre and of the latest pattern. The garrisons of the other forts are also to be increased, in consequence of the increase in the German forces on the French frontier.

A DANISH TOMB. — The Copenhagen correspondent of the *Pall Mall Gazette*, writing on July 20th, says: "A most interesting discovery of antiquarian remains has just been made close to the town of Storeheddinge, in Zealand. About nine feet below the surface of the earth a tumulus was discovered, surrounded as usual with fifteen large stones raised on end, and covered with other large stones, which, when removed, disclosed the interior of the tomb, which was about sixteen feet long and three feet wide. On the bottom was laid a broad piece of oaken plank, on which were found the remains of a woman evidently buried in her clothes, the face turned toward the east, the left arm crossed over the chest, and the right arm stretched out by the side of the body. A large number of vessels of various kinds were placed around the head, the most remarkable being a cup of blue glass, surrounded by a richly chased silver rim representing the leaves of the vine, having an inscription in Greek characters which translated means 'Farewell.' Next may be mentioned another cup of red-colored glass, and a large vase of green glass, besides many pieces of other cups which had been crushed by one of the stones having fallen in. In the blue cup the ribs, and in the red cup other bones, of different kinds of fishes, were discovered. To the right of the head lay a gold coin which had evidently been used as an ear-ring, dating from the reign of the Roman emperor Probus, whose short reign lasted from about the year 276 to 282. The tomb consequently cannot date further back than from A.D. 276. A large and beautifully-embossed ring of gold enclosed the neck, and close to the right shoulder lay a thick golden pin, probably used to hold the upper garment together. On two fingers of the right hand were two massive rings of gold, the one spiral-formed, the other plain, while close to the waist one large and several smaller buckles of silver were discovered. A collection of bones of various animals lay close to the feet of the body, as well as a wooden basin ornamented with bronze handles, containing forty-two dice turned from bone, and apparently used for play. In a large Roman basin of bronze, which stood at the extreme end of the tomb, the bones of a small pig were found, other bones of the same animal being discovered in the surrounding earth, as well as the remains of human beings, possibly bones of slaves who had been sacrificed at the funeral. The discovery is here looked upon as being of the very highest antiquarian importance, while it adds another proof of the relations which so early existed between the north and the south, which were mostly carried on through the present Russian provinces, and which finally, in the eighth or ninth century, culminated in the creation of a special body-guard of the emperor in Constantinople, consisting of the so-called 'Varangians,' — an institution which lasted nearly until the final overthrow of the Byzantine Empire by the Turks. The Government is going to institute further researches round the tomb, as many signs seem to indicate that this place in olden times has been a kind of regal burial-place."

A MOSQUE AT STAMBOUL. — Amongst the mosques of Constantinople is the Mosque of Eyoob, the standard-bearer and companion of the Prophet, who was killed at the siege of Constantinople by the Arabs in 668 A.D. In the last part of the fifteenth century Mohammed II., to whom the position of Eyoob's grave was revealed in a vision, built a tomb and mosque at the spot indicated. Christians are not allowed to enter this holy place: so that they are deprived of the pleasure of seeing one of the finest mosques in or near Constantinople.

THE TAJ MAHUL. — As a memorial of his wife, Moomatza Mahul, the great mogul Shah Jehan built in 1631 upon the banks of the Jumna, at Agra, the celebrated mausoléan temple known as the Taj Mahul. It was twenty-two years before the 20,000 workmen could finish it, at a cost of about twenty millions of dollars. The quadrangle in which it stands measures 9,654 feet by 329 feet. The area around is laid out in parterres, planted with flowers, blossoming shrubs, and cypresses, interlaced by rows of bubbling fountains and avenues paved with freestone slabs. The mausoleum itself, the terrace and the minarets, are all of the finest white marble, and are thickly inlaid with precious stones. The funeral vault is a miracle of coolness, softness, splendor, and solemnity. Fergusson says of it, "No words can express the chastened beauty of that central chamber, — the most graceful and the most impressive of all the sepulchres of the world."

FORTIFYING THE ENVIRONS OF ROME. — The works for fortifying the environs of Rome, the appropriations for which were voted at the last session of Parliament, have been commenced on the side nearest the sea. They are considered necessary for the protection of the new capital.

A CITY'S CONSUMPTION OF WATER. — Chicago at present consumes between 60,000,000 and 70,000,000 gallons of water daily.

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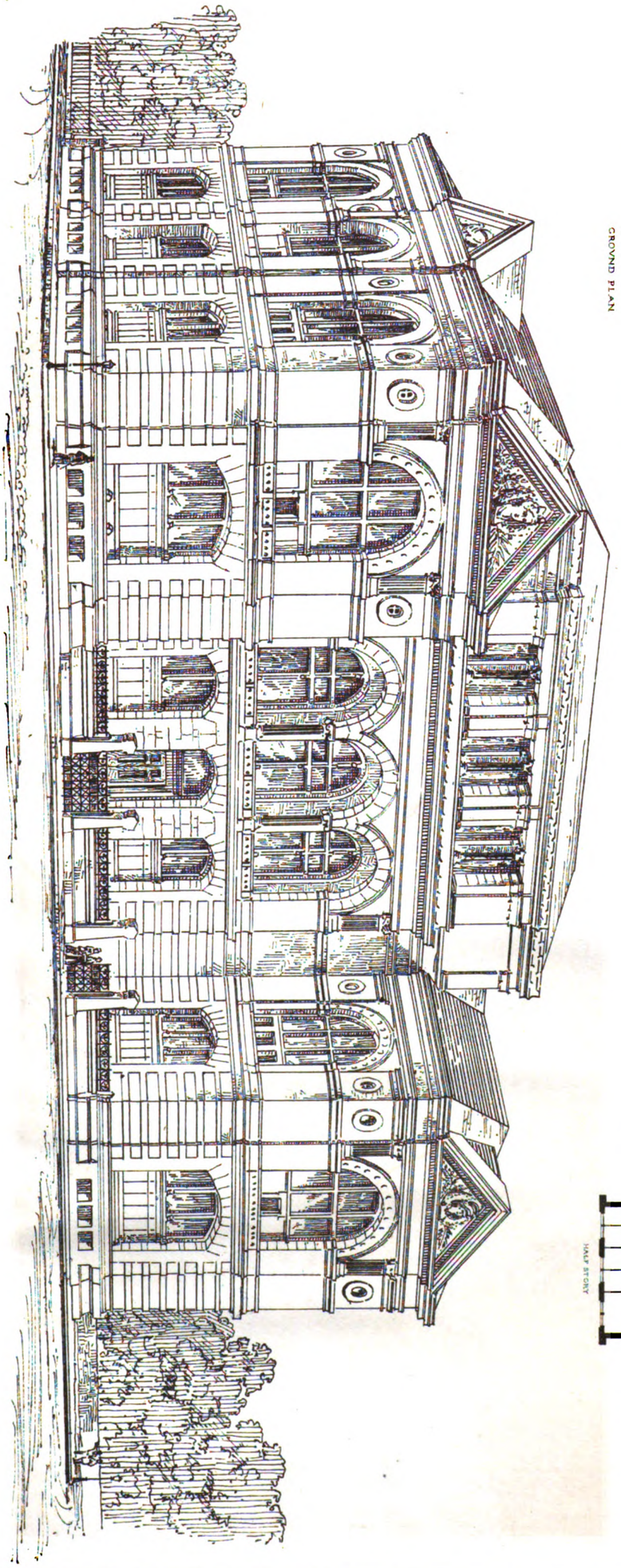
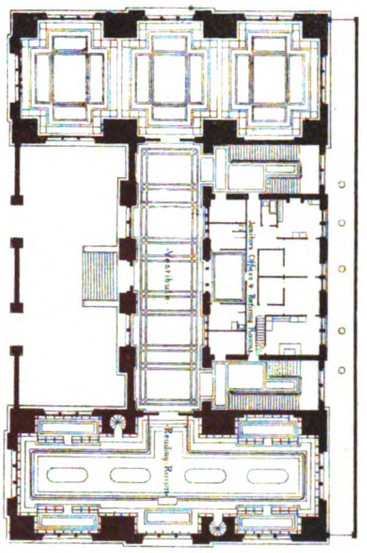
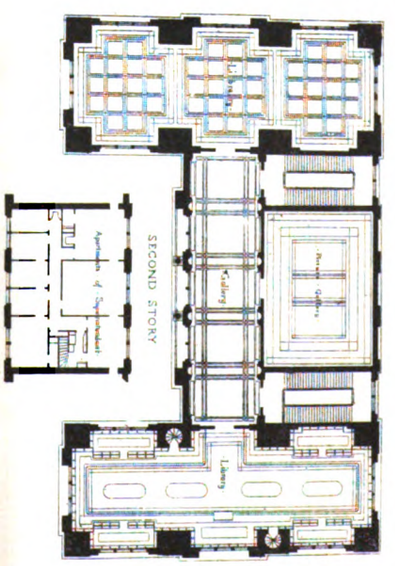


GROUND PLAN





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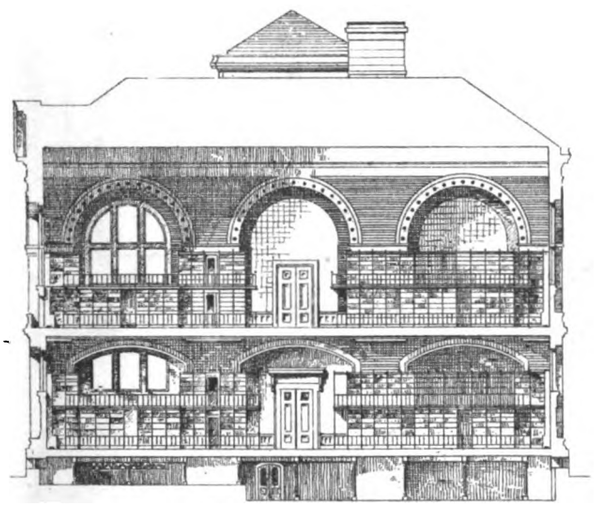

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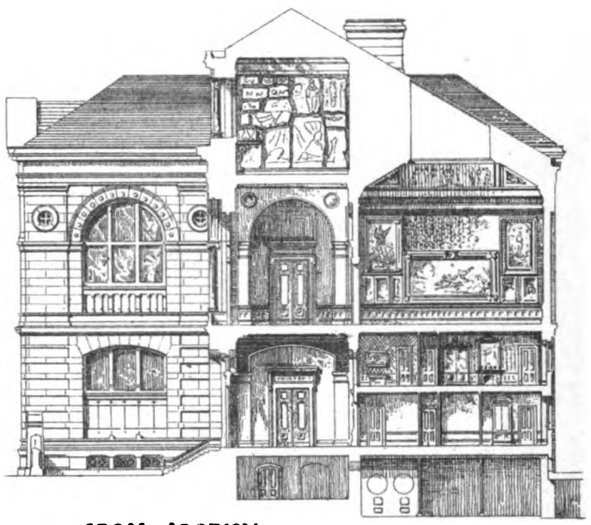

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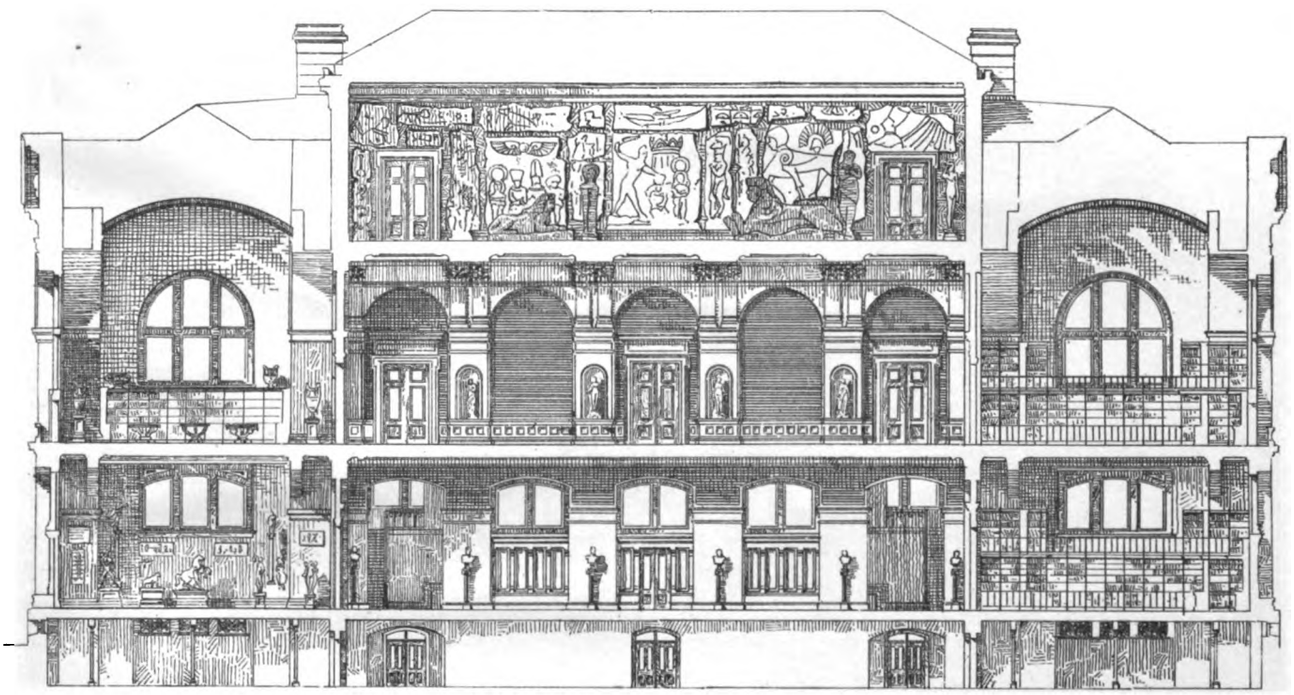

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, SEPTEMBER 8, 1877.

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AT the special meeting of the Board of Trustees of the American Institute of Architects, held at the rooms of the Institute in New York on the 16th ult., to consider, among other matters, the question of the proper treatment of the national monument to Washington, the following resolutions were adopted: —

Whereas, The exhaustive examinations of the Washington Monument at the national capital, which have been made by distinguished engineers and scientists connected with the Corps of Engineers attached to the War Department, show beyond a doubt that the present monument is of such imperfect construction and its foundations of so inadequate a character as to render it unwise to continue the work under any modifications whatever; therefore, —

Resolved, That the American Institute of Architects do respectfully recommend to the Washington Monument Association the abandonment of the present monument and its site, and the building of a permanent and graceful structure on some more suitable and trustworthy location, in memory of the illustrious Father of our Country.

Resolved, That the aforesaid Washington Monument Association be recommended to invite architects throughout the country to submit competitive designs for the said monument, under such regulations as to premiums as the said association may adopt; and that the decision as to the merits of the respective designs be referred to the Corps of Engineers, attached to the War Department.

Copies of these resolutions were forwarded to the various Chapters of the Institute, for an expression of opinion on the subject, which expressions were laid before the Board of Trustees at its meeting on Thursday, the 6th inst.

WE fear that the difficulty of calling members of the Chapters together at this season may have interfered with that full expression of professional sentiment which the subject demands. But these resolutions, before final adoption, should be considered with the greatest care. The Institute cannot be too cautious in committing itself on the subject of competitions; and in the present case it may be establishing a dangerous precedent in recommending the Monument Association to prepare, and the profession to submit to, a scheme and a final judgment both of which are without the advantage of professional advice. As this question is mainly a question of art, it is evident to us that in preparing a programme for such a national competition as is proposed, some representation of the body of architects should be present to counsel and advise. The preliminary considerations must necessarily involve the difficult point as to the expediency of retaining the truncated obelisk as the basis of design. Doubtless, if we take the highest ground of art, it would be best not to embarrass the free spirit of design with a condition so cumbrous and unusual. But the question of expediency must have great weight; and if the present structure can be made available, it would not be wise policy for the Association to sacrifice a mass of masonry so costly until all its possibilities of adaptation shall have been fully considered. If the foundations can be strengthened, if the present investment can in any practicable way be saved, it would seem that a solution of the problem thus presented by such resources of art as are at our command can be fairly challenged, however unpromising and unpoetical the conditions. It is not for us to shrink from the task. The genius of the country, if properly invoked, may prove equal to the emergency. For these reasons, and inasmuch as the appeal must be made mainly to the architects, we believe, whether the present structure is retained or not, that some one familiar with the conduct of competitions and with questions of art should advise with the Association from the beginning; and that, with all due respect to the distinguished corps of engineers attached to the War Department, it would be imposing upon them an ungracious task, — a responsibility which they would gladly avoid, — to make them the sole judges as to the relative merits of the designs submitted. It would take them into unfamiliar regions wherein, from the very positive nature of their habits of thought, they could not work with satisfaction to themselves or to the country. It is, as we have said, eminently a question of art, to be proposed, studied, and decided with that artistic feeling which results from special education. The dignity of art and the best interests of the nation therefore would, we consider, be equally subserved by simply submitting to the Monument Association, in behalf of the architects of the country, two resolutions, the one embodying an earnest protest against the completion of the original design, and the other a respectful proposition to assist the Association, by committee or otherwise (and, if desired, in conjunction with the corps of engineers attached to the War Department) in the consideration of the means whereby the highest art of the nation may be made available for the complete fulfilment of the enterprise in their charge.

AT the meeting of the Board of Trustees of the American Institute of Architects, held on the 16th ult., the following resolution was passed: —

"*Resolved*, That, in the opinion of the Board of Trustees, the interests of the profession demand that an appeal be made to the self-respect of the members of the American Institute of Architects to abstain from participation in the competition for a proposed Hospital for the Insane for the South-eastern District of Pennsylvania, as per advertisement in the *American Architect and Building News* of July 21 and 28 of the current year."

This resolution was submitted to the Chapters of the Institute for an expression of opinion. The conditions of this competition, and our remarks in relation thereto, may be found in our issue of Aug. 4, page 246.

THE mayor of the city of Boston has it in contemplation to remove the present incumbent of the office of Inspector of Buildings, Mr. Oliver Shaw, who has performed the duties pertaining to it with general acceptance for four years. All the architects of the city, together with the principal builders, a large number of real estate owners, and many others, have signed petitions requesting the mayor to retain this officer in consideration of his efficient service. We understand that the petitioners (certainly the architects) have felt constrained to take this action, not because they object to have the office more efficiently filled, or because they consider Mr. Shaw, however useful he may be in this function, absolutely the best man for the place; but because it is generally understood that the place is needed by the mayor as a reward for some political adherent, without necessary regard to his capacity, experience, or especial training. Indeed, the name of the candidates hitherto suggested are unfamiliar to architects or builders, but are known to have active associations with the details of local politics. The statute of the year 1872, providing for the creation of this important office, very properly requires that the Inspector and his assistants "shall be able and experienced architects, builders, or mechanics." This does not mean plasterers, plumbers, or mathematical-instrument mak-

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ers, but men experienced in general building operations. The present incumbent fulfils this requirement; he has proved himself a vigilant, efficient, and honest officer, and has the advantage of special knowledge gained by experience. These are qualities too sterling, and are employed in duties too important to his fellow-citizens, to be lightly thrust aside in order to adjust a political machine. This statement is pertinent in these pages, because from constant contact with the office we know the peculiar value of technical knowledge and training in executing the provisions of the Building Act, and that without such knowledge and training in the executive department, the act must in part remain inoperative, and the citizens must lose somewhat of the protection to life and property which it is intended to afford. In this view of the case, it is not merely a blunder, it is a crime, to displace this officer, unless there is the strongest *primâ facie* evidence that the change will render the law more useful to the city, and that the only object in making the change is to secure this greater efficiency. Where life and property are at stake, the interests of politics become insignificant. The administrator who deliberately, after such warning, weakens the execution of the law in order to strengthen his party, will inevitably be held to the strictest accountability. The city of Boston is not accustomed to see its interests so sacrificed, and will not readily submit, we are persuaded, to such a dangerous prostitution of the powers invested in its chief executive officer. The ability to judge of the requirements of the Building Act in special cases, the resolution to enforce its provisions in the face of a reluctant or defiant owner, the vigilance to discover hidden imperfections of structure, the discretion to define the just line between actual and technical violations of the laws of safety: such qualities, it is fair to assume, are hardly to be found in ward-room politicians, who look upon office not as a serious responsibility, but as a reward for the dark service of party. It is therefore our duty to watch the course of events in connection with the proposed change with the most jealous scrutiny.

OUR English contemporary, the *Architect*, of Aug. 18, contains an interesting abstract of the series of by-laws just issued under the Public Health Act passed by Parliament in 1875, for the guidance of local sanitary boards in the construction and laying out of streets, the building and placing of houses, and the prevention of certain nuisances throughout the kingdom. In fact, these constitute to the whole nation what the building code of the metropolis is to London. Like our own building codes for large cities, this more comprehensive system was prepared under the advice of architects, the board having the matter in charge having obtained from the Institute of Architects a very elaborate statement of requirements covering the whole ground of good building. As regards streets, these by-laws enact that they are to be adapted to the easiest natural gradients, and prescribe the widths of the carriage-ways and foot-ways for various uses and localities, the "crown" of the road, the slope of the sidewalks, and height of the curbs. As regards new buildings, they require under the site of all dwellings a layer of cement or asphalt at least six inches thick; for outside and inside walls of domestic and public buildings and warehouses, they give rules for the footing, for the bonding, for the thickness in proportion to height and length, and for the area of piers. They specify in all dwellings a damp-course of sheet lead, asphalt, slates in cement, or other material impervious to moisture, to be laid under the lowest timbers, and at least six inches above grade. They require parapets on party-walls, three feet high in warehouses and public buildings, fifteen inches in other cases, give rules for the formation of recesses and "chases" in walls, the bedding of timbers in party-walls, for the bearing and support of bressummers, and require the placing of templates under the bearings of all girders. The construction of chimneys is fixed by very careful regulations as to foundations, materials, flues, corbelling, irons or arches over fire-places, and the thickness back of flues in various cases. No anchor or hold-fast is to be placed nearer than two inches to the inside of a flue; no woodwork nearer than nine inches. Roofs are to be externally covered with incombustible materials, and gutters and conductors or leaders are also to be incombustible. We shall take occasion hereafter to refer to the regulations which have yet to appear as to spaces about buildings, ventilation, drainage, etc.

IN our number for Aug. 18 (p. 261) we took occasion, in referring to the report of fires rendered by the Insurance Commissioners of Massachusetts, to state that insecure building as regards chimneys in especial is rather the rule than the exception in all our smaller towns, and to suggest that in order to provide against this constant and obvious danger, as well as against those of bad ventilation, imperfect drainage, and insalubrious sites, — dangers which we have always with us, fruitful in enormous loss of property by fires, and enormous loss of life by fevers and endemic diseases, — remedies should be speedily applied by legislation. The example which England has set us in this respect, and to which we have just briefly referred, is worthy of the most careful consideration. We hardly expected to see the eminent practicability of such legislation so soon illustrated; and we are convinced that the local Chapters of the American Institute of Architects, in conjunction, if necessary, with the underwriters and the Boards of Health, could readily, under the inspiration of facts, and with such an admirable example before them, put the remedy in such practicable shape that the State legislatures could not resist taking prompt action. In this manner the architects would once again justify themselves before the public, and secure that respectful consideration which it often seems they have yet to earn. To formulate for this purpose the familiar principles of sound building which guide the profession daily in preparing plans and specifications, and to make these principles capable of general application, would seem to be no very difficult task.

CAPT. JAMES B. EADS, engineer of the iron bridge across the Mississippi at St. Louis, and of the jetties at the delta of the same river, in conjunction with Mr. A. O. Lambert, also an eminent engineer, has prepared drawings and estimates for a bridge across the Bosphorus, connecting Constantinople with the Asiatic shore. This work, it is stated, will be about 6,000 feet long in 15 spans, the central one having a length of 750 feet, the two adjacent spans 500 feet, and the rest diminishing towards the ends to a minimum of 200 feet. The height of the roadway above the surface of the water will be 120 feet; 60 feet less than that of the Brooklyn bridge. The piers of the central span will be 50 feet thick, sunk in 100 feet of water. Submarine surveys conducted by the French and Turkish governments have disclosed the fact that there is solid rock about 20 feet under the bed of the river. The currents of the Bosphorus have great velocity, but less than that of the Mississippi at St. Louis. The experience of Capt. Eads, therefore, in the latter place will be of great value to him in sinking caissons for the construction of these mighty piers. The cost of the work is variously estimated at from $18,000,000 to $25,000,000. The spans are iron arches, so constructed that the weight of a train of cars or of troops moving in unison over the bridge will be distributed over the whole structure. We learn that English interests are largely concerned in this undertaking, as an essential part of the scheme of the "Euphrates Valley Railroad," by which it is proposed to connect Constantinople with the British possessions in India. The rival plan of M. de Lesseps, the engineer of the Red Sea canal, contemplates a railway from the Volga, across Turkistan, to Northern India. This is in the interests of the Russians. It is possible that under the pressure of the rivalry between these two nations, the vast scheme of Capt. Eads may ultimately be realized.

M. BEULE ON GREEK POLYCHROMY. — III.

I SAY nothing of the interiors of temples. No one has ever said that they could not have been painted. Nevertheless the temple of Egina alone has shown traces of color. Blue has been recognized upon the columns, red upon the walls, green and other tints upon the cornices. The ceilings of the porticos also were necessarily decorated with meanders and eggs. The soffits were also painted, and the coffers with golden stars on a blue ground. This is not the question. The problem is the exterior of the temple, the general aspect of the monument, — its complete effect. We have found color everywhere except upon the exterior wall of the cella. Did the columns, clad in a pale tint, stand out against a strong background? Blouet and Wagner have said that the wall of the temple of Egina was painted in red. Behind the Propylæum of Athens I have found red stucco

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upon an older wall, of which Mnesicles has left only a pier standing.

There remain to us too few fragments of the Ionic order up to the sixth century to restore the paintings which decorated them. It is probable, since it was derived from the Doric order, that their ornaments had much analogy. In the Ionic they must have been more delicate and more multiplied. There are two capitals in the Acropolis at Athens, and a third in the temple of Theseus. I have already noticed these precious remains which Le Bas has published, and upon which M. Laudron has restored tints which conform to the favorite colors of archaic times. The outline alone remains; and the leaves, eggs, and frets can be seen applied to the mouldings to which their forms belong. We see the honeysuckle, still a little awkward, in the angle above the volute. Upon the sides of the capital, the frets, the leaves, the scales which are applied to the baluster, are also easily distinguished.

I can make here only a rapid review of the application of painting to the temples of the sixth century. The smaller details, the ornament of delicate mouldings, which I am obliged to omit, will be found in special treatises. We have collected enough of them to be well convinced that in the age of Pisistratus the temples were completely painted. There is no point where the traces of color have not been found, and that after so many years, so many devastations, and the prolonged action of climate.

Now what is the character, what is the style of archaic polychromy? It would naturally be in harmony with the character and style of the architecture. So long as the proportions are heavy, the mouldings simple, squarish, and even flat, the ornaments would not be free from a certain heaviness, a weight which later would give place to an ingenious delicacy. The diaper, which is to be seen upon a fragment at Athens, has a disconnected effect, scarcely architectural; it disappeared later, and descended to the floor, where it became a motive dear to mosaic-workers. The honeysuckle of the old Parthenon is heavy; its outline is strongly enforced by a sinkage, where the red color still remains. How unlike this is to the light and elegant honeysuckle which the following centuries preferred! At Egina the epoch is more advanced, and the ornaments already show more richness and grace. The colors must themselves submit to the logic of epochs. The hues of archaic times are harder, more austere. At first they feel the influence of terra-cotta, frequently employed, which takes only a few colors: yellow, red, brown, or black. Moreover, the favorite harmonies are grave and sad, — yellow and brown, brown and red, blue and green, yellow upon black, red upon black. The liveliest tones used were red and blue or red and green. These effects were not without grandeur and beauty. Distance effaced, perhaps, an appearance of hardness; besides, this hardness even had something architectural in it, and set off the decoration better.

Thus far we have set aside all theories, all preconceived ideas, all preference for systems, to consider only facts. Perhaps I may now be allowed to offer some hypotheses, which may be received with all the distrust which hypotheses deserve: —

For the history of polychromy I would assert the following: The first temples were of wood: this seems incontestable; and in admitting even that the influence of Egypt and of Asia, where every thing was painted, was not considerable, the very nature of wood called for color, if only to preserve it. There is nothing surprising in the blue wax for the triglyphs of which Vitruvius speaks. This coating protected the wood by filling its cracks, holes, and knots. Its color was crude, uniform, primitive, as you please; but I see in it necessity before there was art or effort at art.

Soon stone was substituted for wood. But in imitating it, in preserving its construction, its principles of stability and of adjustment, and its aspect, it was natural to preserve its colors. Was this from religious tradition? I know not. It was, at all events, from a tradition quite as strong, — habit. Such is the tyranny of habit, that it yields to progress only by slow and insensible transitions. After ages and ages, monuments without color come to be loved; but this cannot come suddenly, the very day that wood is exchanged for stone. If the stone has an uneven grain, and holes and flaws, which unfit it for painting, the stone will be coated with stucco. The oldest temples — those of Corinth and Paestum, Metapontus and Ægina — are covered with stucco.

We know, from certain proof, that stone temples were entirely painted at the time of Pisistratus. To the primitive tints were added, little by little, ornaments, more delicate details, running bands upon the mouldings; and it was a natural progress for art to go on multiplying this decoration, seeking variety, splendor, and, what is superior to splendor, clearness; for painted ornament upon the Greek temples, so far from injuring the effect of the architecture, or altering its forms, gave them value and prominence. I should except, perhaps, the Ionic capitals, of which I shall speak later, where the forms seem invented for the ornaments, and not the ornaments for the forms.

But let us imagine a temple of the Doric order, in stone, and covered with stucco. Would these tones be left white, monotonous, insipid? Stucco is a clothing which conceals the fitting of the stones, that fine appearance of bonding which gives security in our eyes, and which assures us that the building is solidly and logically built. . . . Architecture demands that color shall give to stucco, which is the envelope of its temple, form, meaning, and life, placing itself in intimate relation with the stone, that is to say, with the body of the temple. The color will mark the triglyphs and all parts of the design; it marks all the joints and all the essential members of the construction; where the stucco has nothing to emphasize, it will receive its own ornament, created by fancy, which will give elegance and lightness, as a garment of many folds has its borders and its embroideries.

We are used to seeing, in our cold and rainy climates, nothing but dull and blackish buildings. Colors and paints disappear quickly under our thick and corrosive fogs. Color, the delight of the eye, is not made for the people of the North. We scrape our buildings; to-morrow they are black again. We scrape them once more, and so we go from white to black, through intermediate grays, — true funereal hues, — which have more influence on the aspect of a town and the humor of its citizens than we suspect.

Let us make an effort of imagination, and, freeing our ideas from a routine which is the only source of our prejudices, let us look from the point of view of the olden time at Greece, Sicily, and Asia, with skies worthy to illumine the youth of the human race. Imagine a glowing sun, which suffuses every thing, colors all that it touches, and gilds the very rocks. Around the cities of the seafaring Greeks the deep-colored sea spreads its vast and changeful surface. The sunrise and sunset are of a splendor unknown in our country. The Greeks to this day call the sun's setting his reign, his special glory, — *Βασιλεύσις*. The very mountains reflect a thousand tints, which change from hour to hour. Amid this smiling and resplendent nature imagine a people, elegantly dressed in handsome draperies, the white offset with rich colors, the purple in all its glow; their linen dyed and embroidered by young girls' hands, a crown of flowers on every head at time of feast or sacrifice. Everywhere are porticos, fountains, resting-places, whence the idle throng can view their cherished city; warriors returning from their expeditions, with shining arms and painted shields; galleys furrowing the seas with vermilion prows, and stretching to the winds sails yellower than saffron. Everywhere is light and beauty; and color, the light of beauty. . . . On the high hills that overlook the towns, in their public squares and promenades, on their promontories stretching out to sea, imagine their temples, brilliant with color, always fresh because always renewed. They are not scraped, they are repainted; and not by journeymen, but by artists. Their columns of pale yellow, with capitals delicately ornamented, detach themselves boldly from the red walls of the cella. Their strong triglyphs show their blue front, and display the construction afar off. On their pediments, colored like the sky, Ajax, Hector, and the Homeric heroes are fighting. The fine mouldings of the porticos and entablatures are contrasted with their plain backgrounds by ornaments which mark them to the eye and give them value. Painted tiles shine beneath the sun's oblique rays; antefixæ with Medusa's head, acroteria, griffins with extended paw, crown the edifice; and color lends these monsters illusion and life. Their silhouette, outlined against the sky, gives lightness and movement to the whole building. To these add wreaths, garlands of flowers, golden shields hung against the architraves, inscriptions in letters of gold,

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gates of bronze, trophies, statues, altars, vases, offerings innumerable. With attention quickened and informed by study, let us contemplate within ourselves this radiant apparition of the antique temple, and then dare to say, as has been said hitherto, that it was the work of barbarians.

Barbarians! I am afraid that it is not the ancients who are the barbarians. We are a people full of taste; we believe it, and it is true; but taste is a small thing compared with the great sentiment of art. And by what right do we moderns, whose degenerate sense can no longer bear any but pale and sickly tints, violet, pale rose-color, pearl-gray, tender blue; we who invented, or rather borrowed from ladies' dressing-rooms, harmonies of colors as false as they are insipid, that have a deplorable influence on our school of painting, — by what right do we tell the Greeks, our masters in art, whom we have never succeeded in equalling, "You are barbarians"? We are like those descendants of old families who stagger under the lances of their ancestors, and cannot even lift them. These lances have gained battles; and so the colors with which the Greeks painted their temples have been the object of admiration, the cause of delight to a whole people, — a people mightier in art than ourselves, and with a far grander comprehension of divine beauty.

SANITARY ENGINEERING.[1]

IV.

AFTER treating quite fully, and with some novelty, of the storage of rain-water for domestic use, the construction of tanks, filtering appliances, etc., Mr. Denton, in his "Concluding Remarks on the Sanitation of the Dwelling," says in substance, —

Whatever good may come of giving pure air and pure water to a town, a village, or a hamlet, unwholesomeness of living may still come from the bad sanitary arrangement of dwellings. Sewerage, water-supply, cleansing, and scavenging are everywhere regarded as essential; yet the dwelling — "the unit of sanitary administration" — is held sacred against the intrusion of the health officer. Every dwelling — from the palace to the cabin — must sooner or later be subject to sanitary rule, and its occupants must be compelled to turn to proper account the pure air and pure water placed at their command. It is hoped that each dwelling will be let with a certificate of healthfulness, and that the tenant will be compelled to maintain the healthful condition. Owners and speculating builders will resist obligations; but resistance to such a necessary change cannot long prevail. A large proportion of newly built houses are without proper sanitary appliances. Such as do exist are of bad construction or of inferior material. A great difficulty in the way of improvement, is that the supervision of such works is intrusted to ignorant inspectors; and it is of the earliest importance that such vital duties should be placed in the hands of properly qualified persons, — a class of persons yet to be created.

Mr. Denton gives an epitome of the chief desiderata in the sanitary improvement of dwellings, which may be briefly given as follows: —

1. No cesspool within or under any dwelling, under any circumstances.
2. No drain should pass under any dwelling, if it can be avoided.
3. Soil-pipes should be thoroughly ventilated, also any space connecting the water-closet with the soil-pipe; as, for example, the chamber under the valve of the ordinary water-closet.
4. All outlets from sinks and slop-hoppers should discharge, not into the soil-pipe, but by independent pipes leading through the side of the house, and delivering over a "trapped gully" in the yard, outside of the house.
5. All solid refuse should be removed at short intervals.
6. All private sewers, drains, traps, and gullies should be thoroughly water-tight, to protect the ground from pollution.
7. All private sewers and drains should be kept clean by flushing, and all grease should be intercepted.
8. Ground water should be removed by under drains, so that it may not stand within three feet of the foundation of the house.
9. Cellars and basements should be protected against soil moisture by damp-proof courses, concrete flooring, and air-spaces between the foundation-wall and the ground.
10. No water should be used for domestic purposes which is not up to the "attainable standard of purity:" where possible, it should be supplied direct from its source, without the use of a cistern or tank in the house.
11. All water drawn from a cistern or tank in the house should be filtered after it leaves this.
12. No water for cooking or drinking should be drawn from a cistern from which water is *directly* drawn for water-closets and sinks.

These suggestions have our full indorsement, with the exception of paragraph 4. In our opinion it is always safe to discharge all properly constructed outlets into a properly constructed and thoroughly ventilated soil-pipe. In our northern climate the "trapped gully" may give trouble in severe winter weather; and it is always a possible source of foul air outside of, but near to the house.

The section on *The Dwelling* concludes with a Postscript, from which we quote a statement which is fully applicable to our own country houses of the better sort: "The observations I have been able to make lead me to the conclusion, that there is no class of dwellings which more positively demands sanitary re-organization than that which comprises the mansions of our country gentry, while I believe that there is no class of society which will less readily acknowledge the fact than that which occupies them."

It is suggested that occupiers of such houses should examine for themselves: 1. The state of the domestic offices and dormitories; 2. The condition of wells, tanks, and cisterns; 3. The way in which objectionable gases may find entrance, "by unventilated soil-pipes and sink-pipes, from sewer and cesspits, into the rooms and passages frequented by themselves as well as their servants;" that they should know the condition of the surrounding ground, often soaked with sewage from leaky sewers, and with roof-waters carried into such sewers.

"Surely there can be no greater mistake than this assumption," that the pure air of the country protects country houses against air pollution, and that, because they are remote from *other* dwellings, the water of their wells is free from contamination. Then follows an account of the actual condition of things, which may well make the unaccustomed reader shudder, but which is nothing more nor less than a correct account of the condition prevailing about a very large majority of our own country houses, even of the best class.

The following suggestion is quite as appropriate here as in England: "No country house should be without a plan of its sewers, drains, and water-pipes, conspicuously placed for the observation of servants as well as superiors; and no pains should be spared to make every one understand that the sewers and sanitary appliances of a country dwelling require just as much care and attention as the public sewers of a large town. . . . In the absence of such a record, as much money is expended in ascertaining the cause and position of any thing wrong as there is in putting it right when the defect is ascertained."

[1] Sanitary Engineering: a series of lectures delivered before the School of Military Engineering, at Chatham, Eng., by J. Bailey Denton, F. G. S. M. Inst. C. E., etc. E. and F. N. Spon, London and New York.

THE ILLUSTRATIONS.

TWO CONDEMNED CITY CHURCHES: ST. DIONIS BACK CHURCH, FENCHURCH STREET; THE CHURCH OF ALLHALLOWS, BREAD STREET, CITY, LONDON.

THESE drawings taken from the *Building News* are of interest, as representing the first of the City churches to be demolished.

The Church of St. Dionis has its east front in Lime Street, and south side towards Fenchurch Street, though the latter is almost hidden by a range of low buildings fronting upon Fenchurch Street. The present building is the third church dedicated to St. Dionis, or rather St. Dionysius, which has stood upon this site. When the original church was erected is unknown, but it is mentioned as early as the 13th century. This gave place, at the commencement of the 15th century, to a new building, which seems to have been of considerable importance until it was destroyed in the great fire of London in 1666. The present building was finished (with the exception of the tower) in 1674, from the designs of Sir Christopher Wren. The tower (erected in 1684) stands at the south-west corner of the church, and was originally surmounted by a small turret, which was removed about 50 years since. It will be remembered that this is the tower Mr. Street is said to have proposed to Gothicise.

Respecting the general appearance of the building which preceded the present church of Allhallows, Bread Street, now, in its turn, about to be demolished to make room for business premises, nothing is known; but on referring to Godwin and Britton's "Churches of London," we find mention made of such a building occupying this site as early as the year 1349. After the burning of this place of worship in the great fire of 1666, no steps seem to have been taken by the parishioners to supply its place till in 1680, under the superintendence and from the designs of Sir Christopher Wren, the present edifice arose. The cost of this new building was £3,348 7*s.* 2*d.*, part of which sum (£600) was raised by a tax on coals (levied for the purpose of erecting new churches in the City), and the remainder obtained by loans.

HOUSE AT PITTSTON, PENN. MR. BRUCE PRICE, ARCHITECT. (841 Broadway, New York, N.Y.)

It was designed to construct this building so as to show a hard-wood frame from the base stone work to the second-story water-table, with porches, conservatory, balcony, and eaves-bracketing of the same. The work was to be oiled, and all chamfers colored. It

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was to be boarded with clapboards, and painted; the second story was to be covered with gray-green slates, finishing against hard-wood corner-posts and window-frames. All windows were to have broad outside sills, protected by iron railing, for flower-pots. The chimney-stacks were to be of pressed brick relieved with encaustic tile in panels. The top sash of windows filled in with domestic stained glasswork. The eaves were to be bracketed out over the second-story windows about four feet, to afford protection from sun and storm. It was estimated to cost between $5,500 and $6,000; but owing to the depression in the coal business and the consequent stagnation of almost all other business in the Wyoming valley, the carrying-out of the work has been "indefinitely postponed."

SEE-HOUSE FOR BISHOP COXE, BUFFALO, N.Y. MESSRS. OAKEY AND BLOOR, ARCHITECTS.

(Room 9, German Insurance Building, Buffalo, N.Y.)

This design is peculiar from the necessity of adapting it to the foundations now in the ground, and formerly intended for Christ Church, whose completion was abandoned. The drawing-room and reception-room are placed upon the foundation originally intended to carry the tower of the church. It has also been necessary to adhere to the lines of foundation on the lines of all but the rear wall. The materials are limestone from the neighborhood, with Amherst cut stone; and above a certain line the main walls are carried up in red brick with red joints. The roof will be covered with red tile. The mullions shown in the windows are to be stone in every instance, and with few exceptions the lights will be set in lead.

THE TOWER OF JEAN SANS PEUR, PARIS, FRANCE.

One of the dramas of the reign of Charles VI., of France, was the assassination of his brother, the Duke of Orleans, by the order of the Count of Burgundy, known as Jean sans Peur. The assassination accomplished, the Count of Burgundy, unaffected by the remorse which caused one of the actual assassins to place in a turret of the Hôtel Barbette where the deed was done, a lamp which was kept always burning, thought only to assure himself against all evil consequences that might follow. He retired to the Hôtel d'Artois, which from that time was known as the Hôtel de Bourgogne, and built there a donjon, which Monstrelet calls *une forte chambre de pierre bien taillée*. This donjon is still standing in Paris, and of it M. Edouard Fournier says: "Nothing is wanting in this tower, at least ninety feet in height; it even has its crenellations, and to restore to it its original appearance it will but be necessary to remove the roof. Certain symbols, a plumb-line and two planes, still exist in the tympanum of one of the bays on the left-hand side, and are, as it were, the signature of the builder. Jean sans Peur wore them on his coat-of-arms. Upon the right-hand side of the principal façade lighted in times gone by by an immense pointed window, almost wholly built up, juts out a turret of the same form as the donjon itself. This contains the staircase, which is itself a marvel: its steps, cut from a single stone, unfold themselves like the leaves of a fan about a newel of the boldest design, from the summit of which springs a tree, which rising to the ceiling clothes the whole vaulting of the tower with its admirably carved foliage. It is one of the most curious as well as the most forgotten jewels of our architecture of the fourteenth century."

THE "GOLDNE DACHL'," INNSBRUCK.

Count Frederick of the Tyrol, who was nicknamed "empty pockets," built about 1500, a palace which cost 30,000 ducats (about $70,000), to prove that the soubriquet was unmerited. One of its features is the rich late Gothic balcony covered by a gilded copper roof which gives the name to our illustration, which, with the Tower of Jean sans Peur, is taken from Dollinger's *Architectonische Reise-Scizzen.*

CORRESPONDENCE.

BRICK-MAKING IN CHICAGO AND VICINITY.

CHICAGO.

THE recent disaster at Rockford has been the cause of directing considerable attention to the method in which common bricks are made and used in this section of the country. I say common bricks, because the case is entirely different with pressed brick: wherever these are made, the parties engaged in their manufacture generally produce the best article that can be obtained from the materials procurable, since being used in exposed places, they are carefully examined by buyers. The price to be obtained depends altogether upon their uniformity of finish and color; and there is a great variation in the prices of pressed bricks from various localities.

With common bricks, on the contrary, it is assumed that they must be the cheapest kind made; and in trade it is common to compare prices of bricks from various localities and of different manufacture without reference to their quality. Wherever common bricks are to be employed in building, those which are cheapest, that is, bring the lowest price per thousand, are, in ninety-nine cases out of a hundred, used. This is not the case in localities such as those in the neighborhood of New York, where the standard grades of North River brick are well known, and where the manufacture of one locality supplies a large district. But, within a large area in the neighborhood of Chicago, every place of importance has its own brick-yards, and its own way of making bricks. It is seldom that common bricks are transported to any considerable distance. The clays vary in different localities; and more or less skill and care are taken in the manufacture. It may be assumed, however, that nearly everywhere the cheapest process is used, and whatever advantages the bricks of one locality have over those of another is due more to chance than intention.

The bricks of Milwaukee are justly celebrated; but they are used very little outside of that city. The pressed brick have a decidedly *buff* color, and are brighter than any other light-colored bricks made in this country. They have been highly prized in the East, and have been transported to great distances, and used for ornamental effects at great expense. They are not as even in size as Philadelphia bricks, and have to be rubbed when used in fine work. They are very little used in Chicago, where they can be had at moderate cost, because the prevailing coal-smoke of the city quickly destroys their color. The Racine pressed brick are fully equal to those from Milwaukee, and have a more creamy color. Both of these bricks have the added advantage of being the hardest pressed bricks made. The Milwaukee common bricks are the best made in the West. They are also buff in color, and extremely hard. Formerly the Milwaukee selected common brick were considerably used in Chicago for piers; but it is very seldom that they are now employed.

Everywhere in the State of Illinois the common bricks are superior to those of Chicago in uniformity and color; but in many places they are inferior in hardness. In some localities they are red; in others, buff. The red clays generally make the hardest bricks. The Rockford bricks have a beautiful buff color, and are very uniform; but are extremely soft. The clay used would probably make an excellent pressed brick with proper manipulation; and if well tempered with ground brick, and mixed with the proper quantity of sand, would make very good hard brick.

The Chicago common brick may be said to be of accidental growth. As there are no clay-banks here, and nearly all the country around about is of clay formation on top, it was first necessary to dig for the clay. The enlargement of the Chicago river, and the excavation of numerous slips in the lumber district, where vessels could be unloaded directly into the yards, afforded excellent opportunities for procuring clay cheaply. When new slips are to be dug, brick-yards are established all around them, and the excavated clay made into bricks. This system makes bricks cheap, and gets rid of the excavated matter with little expense. When a slip is completed, the brick-yards are moved off, and the lumber-business takes possession. Thus it will be seen that the brick-business is of a migratory nature of necessity, and consequently it is of little object to the manufacturer to employ any but the most primitive processes, and the least amount of machinery for properly preparing the clay. The manufacture lacks that permanence which is essential to its proper development.

Though this has grown to be a first-class city in business importance, the manufacture of bricks has not improved during twenty years past. The slip-digging process is still going on, and the slip-shod method of making bricks is still continued. The primary fault in our bricks proceeds from natural causes. The clay-beds are more or less permeated with limestone gravel. As long as this is not eradicated, the pebbles are burned into lime, which slakes as soon as the bricks are exposed to moisture; and many of them fall to pieces in consequence. The force of these fractures is so great, that cracks are often found in new walls, proceeding from small pebbles which have slaked after the bricks had been laid. These pebbles could be got rid of either by washing the clay, or grinding it. The latter process is employed in preparing the clay for making pressed bricks at Downer's Grove, near this city. The particles of limestone are thus distributed uniformly through the bricks, and are harmless. In consequence of the presence of these limestone pebbles, the percentage of loss in bricks after delivery is very large; and it is the custom to estimate twenty-two and a half bricks to a cubic foot of wall, while in reality each foot contains only eighteen bricks. Brick manufacturers only have to handle the bricks once. They are placed on carts at the kilns, and delivered directly at the building-sites. It is quite customary for them to delay firing the kilns after stacking, when the demand is slow; and they make great exertions to deliver them as soon as possible after cooling off, lest the bricks, by standing in the kilns, may become air-slaked.

Another fault in the manufacture of Chicago bricks is the failure to temper the clay. This should be done by grinding up the soft bricks of each kiln, and adding the dust to each new mixing, together with the proper quantity of sand. Our brick-makers use the sand only, and occasionally introduce coal-screenings, which cause the kilns to burn uniformly. This failure to properly temper the clay is due to several causes. First, they sell all the soft bricks, having established it as a precedent that all buyers must take the *run of the kiln*. This fault is shared by the builders who pay for, and the architects who accept, soft bricks. Second, the manufacture is not regarded as a permanent business,

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and the yards do not remain long enough in any one place to make it an object to the makers to invest in a sufficient plant. A third cause is, that few if any understand the business well enough, or engage in it long enough, to know the necessity for properly tempering clay.

This condition of the brick manufacture is one of the misfortunes of a city where bricks are so extensively used as they are here. For, notwithstanding the former combustible nature of Chicago, it is now the only large city in the United States in which the erection of frame-buildings is restricted by law through its whole extent. As bricks must be employed for buildings of the humblest description, the common bricks are of necessity used in such for front, as well as rear and inside walls. While in New York, Washington, or Milwaukee, the common bricks will make a very presentable wall, here they present a very piebald appearance, yet the poor man has no other resource than to use them in the front of his house, unless it is the questionable one, so much in vogue, of smearing and tuck-pointing. This deplorable method first came in vogue nearly twenty years ago as an expedient for making the ordinary Indiana pressed bricks look like Philadelphia bricks. It is now extensively applied to walls of the commonest Chicago bricks. As these have no particular color they are brought to a uniform red or buff to suit the owner's taste, and then striped off with a tuck joint of black or white, laid on with a steel tool and ruler, generally without reference to the position or size of the original joints.

There are no pressed bricks made in the immediate neighborhood of this city. The first employed here came from Indiana, and these are still used. They are red, but not uniform, and only moderately hard. By careless handling, the corners generally become abraded before they arrive at the buildings. It is customary to strike the joints as smooth as possible, and then resort to the smearing with red wash and tuck-pointing. Within the past year there has been a slight improvement in the manufacture of these bricks; and some fronts have been laid with them in black mortar, with joints of about a quarter of an inch, and showing their natural color. They are about as good as those laid with the North River Collaburgh bricks.

There are now several pressed brick-yards in the neighborhood of Downer's Grove, about twenty-five miles west of here. This is the nearest point at which clay has been found suitable for making pressed brick. In these yards the clay is thoroughly ground, and the limestone pebbles become disseminated through the mass. A machine made in Rochester, N.Y., is used for pressing the bricks, and they are burned in a walled kiln. These bricks are very uniform in size, and have sharp edges. The lime gives them a slightly mottled appearance, and they have a light reddish-brown color.

The hydraulic dry-pressed bricks from St. Louis have been considerably used here. They are the best-looking bricks made west of Philadelphia and Baltimore, and superior to the bricks there made in uniformity of color. It is not easy to distinguish them from the Philadelphia bricks. But they are not equal to them in hardness, and are sometimes affected by frost. This is a fault inherent in all dry-pressed bricks when used in a very cold climate.

The Indiana bricks sell here for fourteen dollars; and those made at Downer's Grove cost sixteen dollars. The St. Louis bricks are delivered at twenty-five dollars. Philadelphia bricks cannot be delivered in Chicago for less than forty dollars. Milwaukee and Racine bricks cost twenty dollars delivered here.

ROMAN CATHOLIC CATHEDRAL AT JERSEY CITY. — BROOKLYN MUNICIPAL BUILDINGS. — WHAT A TENEMENT-HOUSE IS?

NEW YORK.

JERSEY CITY has secured a large Roman Catholic cathedral from designs by Mr. P. C. Kieley of Brooklyn, an architect well known for his works in Roman Catholic church building throughout the country. His latest work, barely entered upon as yet, is the new Church of St. Francis Xavier in Sixteenth Street, New York City. St. Patrick's Cathedral stands on Jersey City Heights, and from the site magnificent views of New York and New York Bay, Hoboken, and Jersey City can be obtained. Excepting the spire, the building is now finished, and was dedicated on the 19th inst. The corner-stone was laid Nov. 13, 1870, and since that time the work has been carried on under the most adverse circumstances. The design is Gothic, the plan showing a nave and aisles, chancel and side chapels, but no transepts. One tower is carried up at the north-east corner of the front. The extreme length of the building is 272 feet, and the extreme width across chancel, chapel, and rectory, 138 feet. The width of the church proper is 86 feet, and the spire rises to a height of 225 feet, with a base 33 feet square. The church is built of blue flint rock obtained from the site and from the neighborhood. The stone is laid in courses, with tooled joints. The finish of door-jambs, windows, buttress caps, and cornices, is of light Hallowell, Me., granite, with hammered face. Granite columns are also used, eight on either side, to support the clere-story walls. The window-heads are filled with geometrical tracery, and the glazing will be double, double thick French plate on the outside, with the stained glass sashes within. Of the aisle windows running very high, there are nine on one side and ten on the opposite side; while over the main entrance, opening upon the organ loft, is a window 30 feet high. On either side of the sanctuary are windows containing figures, of St. Patrick on the Gospel side, and St. Bridget on the Epistle side, while the windows about the end of the chancel are five in number; the central one containing the Sacred Heart, with the Blessed Virgin and her mother St. Anne, on one side, and on the other hand St. Joseph and St. Joachim. Below these windows will be a series of panels filled with oil paintings of the history of the Incarnation. In a series of arcaded panels along the aisle walls, below the aisle windows, the history of religion will be graphically portrayed. The pews, which are very comfortably built, will seat about 2,000 people. The interior woodwork is to be in ash and black walnut. A chapel 30 x 70 feet will flank one side of the sanctuary, while from the other side a cloistered passage leads to the residence of the clergy. Careful attention has been paid to matters of heating and ventilation.

Mr. Napoleon Le Brun has on hand a small alteration to the parsonage of the Roman Catholic Church of the Epiphany, on Second Avenue, near Twenty-first Street. The common brick front is to be replaced by one in brick and stone, more in keeping with the adjacent church; though the sheet-metal cornice is a matter for which the church pocket alone is responsible.

And apropos of metal cornices, Brooklyn has disgraced herself in the new municipal building run up in the rear of the City Hall. It may best be covered in motive and in appearance by the word "mean." Scrimped in size, in workmanship, and in expression, the cheap marble veneering of the front is appropriately capped by a sheet-metal cornice; and even this is trimmed down to the smallest possible size. As the building is to cost a good round sum, this scrimping does not mean economy to the taxpayers; and even were the wretched thing cheap in actual cost, it would still be disgracefully dear for any citizen to claim as his own, and as carried out almost justifies the newspaper criticism in calling the adjacent homely but honest City Hall "magnificent and classic" in comparison.

Much interest is felt touching the probable result of the combination of the leading brick manufacturers on the Hudson River. The Union expects to govern the brick market, and meet the hard times by a forcing up of prices. The dealers do not seem to care much, as they are not selling, and of course are not anxious about buying.

An interesting decision is that recently given in the suit of Mrs. Fanny Musgrave *vs.* John H. Sherwood, turning on the point whether a French flat house shall properly be called a "tenement house." In December, 1873, Mr. Sherwood, who is an extensive holder of Fifth-avenue property, sold to Mrs. Musgrave the third one of a row of first-class dwellings on Fifth Avenue, above Fifty-fourth Street, and it was understood that the houses should remain first-class private residences. Two years after Mr. Sherwood extended the two adjoining houses next the corner, and remodelled the interiors to fit them as apartment-houses, though the exteriors were not changed. Mrs. Musgrave objected, but Mr. Sherwood paid no attention to her remonstrances. Now Mr. Sherwood begins operations with the intention of putting two additional stories upon these two adjacent houses, and Mrs. Musgrave applies for an injunction to restrain. From the text of the decision of the court the following points are taken: —

"It was conceded on the argument that the title under which the defendant holds his property forbids the erection thereon of a 'tenement house,' and thus the point is presented whether or not the conversion and change made by him of his two houses into a French flat or apartment-house is a violation of his covenant. . . .

"The obvious object of such a provision was to free the premises from the confusion and disquiet which must surround any building which is the abode of several distinct families. That the grantor intended to dedicate and preserve the property to and for the use of first-class private dwelling houses is obvious; and while it is conceded that the annoyance and discomfort arising from the occupation of defendant's structures for the purpose designed would be somewhat less than if they were the abodes of the poorer classes, it is still manifest that the distinction is in degree and not in kind. The bustle, confusion, and want of privacy which the grantor intended to guard against would necessarily be present, and to that extent at least his intention would be defeated.

"It was strenuously urged by the defendant that the expression 'tenement-house' must be confined in meaning to the abodes of poor families who, as tenants occupy a single building. The difficulty attending this definition is, that there is no fixed standard by which poverty and wealth can be measured. How many dollars must an individual have to be entitled to be called rich, and how few must he possess to be regarded as poor? Will the name of the building change as its occupants change? Manifestly, it seems to me, not. Some other definition than one which shifts and changes with the families occupying it must be sought for. . . .

"The compound word 'tenement-house' must therefore signify and mean a house with distinct tenements or homes, which separate and different families or persons occupy as tenements; not merely a boarding-house or hotel — for in these the occupancy is not one of tenancy, but that of guests or boarders. . . . No reason occurs to me why, literally and truly, the building of the defendant, which is to be occupied by tenants, in name and in fact, is not clearly within the true meaning and definition of a 'tenement-house.' The injunction asked for must also for this reason be granted."

CHURCH PROPERTY to the amount of $137,000,000 in New York City is untaxed.

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TRAPS FOR WASTE-PIPES.

THE conditions under which traps fail are: —

1. The downward passage of water below the trap when the supply is exhausted above will tend to produce a vacuum below; and the pressure of the air above will cause a certain amount of the water to be siphoned out, — sometimes sufficient to unseal the trap.

2. Threads and hairs lodge upon the bridge of the trap, and by capillary attraction the water is siphoned out.

3. The evaporation of the water in the trap, if it be left unused too long, will destroy the seal.

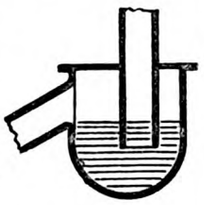
4. A pressure from below is liable to force gas through the water: — a pressure of one ounce to the inch is sufficient to raise a column of water one and three-fourths inches high.

5. The gases, lighter than air, accumulating at the top of the waste-pipes will become absorbed by the water, and be given off again to the air above the trap.

6. If not properly formed, they are liable to become clogged with sediment.

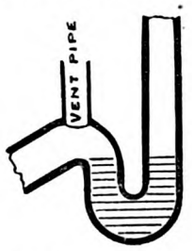
7. In exposed situations, they are liable to be burst by the action of frost.

The liability of traps to be siphoned out by a flow of water in the wastes below is prevented by forming them so that the surface of the water beyond the inlet-pipe will be several times as large as that of the water in the inlet-pipe. In the old D-trap and also in others now manufactured, the seal is secured in this way.



A vent-pipe to the waste beyond the seal prevents the accumulation of a heavy pressure in the waste-pipe beyond the seal, and is a desirable feature in every system of waste pipes.

As a precautionary measure against the lodgement of threads on the bridge of the trap, and the accumulation of sediment, the current of water flowing through the trap should be rapid enough to scour out all obstructions. This necessity has brought about the too general use of the ordinary S-trap, which is defective in so many other respects.



The ability of water to absorb gases and give them off again is one of the greatest difficulties that have to be contended with. It may be overcome by connecting a ventilating pipe with the trap above the seal, and taking it to the kitchen chimney, so producing a constant current of the air in the pipe toward the outer atmosphere. Another method which promises security is that offered by the action of a floating ball, and is embodied in a late invention of Mr. B. P. Bower of Cleveland.

This is shown by the cut. The upper portion is of lead, the lower part of glass, and the ball of rubber. There is a brass seat at the lower end of the inlet-pipe for the ball to work against, and a rubber gasket at the junction of the glass with the lead. When the ball is at rest, there is no communication between the water below and that in the inlet-pipe, and consequently no transmission of gas to the air above, however much the water beyond the inlet-pipe may absorb. When the water is in motion, the current is against any pressure of gas, and it is driven with the water and air down the waste-pipe.

Ammonia, which will find its way through an ordinary S-trap in less than a minute, and show its presence above the seal by discoloring red litmus paper, fails to show any such evidence of its passage through this trap after being exposed for twelve hours.

The liability of the trap to be siphoned out is overcome by the comparatively large surface of water exposed to the air beyond the inlet-pipe.

No amount of back pressure that the wastes are liable to bear will force the water or gas back through the inlet-pipe. This fact will be appreciated by plumbers who have occasion to clean wastes by means of the force-pump.

In case the water above the trap is evaporated, that below the ball serves to seal the trap quite as effectively; and this part of the water, being exposed to the damp air of the sewer, is quite as liable to be augmented by condensation as to be lessened by evaporation.

The ball assists in the scouring action of the water in the lower part of the trap.

The making of the lower part of the trap of glass allows an opportunity for observing if it is working satisfactorily.

The compressibility of the ball allows the water to freeze solid in the trap without bursting it.

The depending portion of the trap, which is the part most liable to be broken, can be replaced by any one, and costs but a few cents.

This trap affords a good opportunity for showing the existence of gas in the waste-pipes. After standing in one position over night, that portion of the surface of the ball below the inlet-pipe will be discolored, while that above will be lighter.

In view of the power of this trap to stop all back-flow or transmission of gases, it may be said to afford perfect protection. It may be used with advantage in connection with fixtures where the only other sure method of getting rid of sewer-gas (a ventilating pipe) would be impracticable or more expensive. F. A. C.

CLEVELAND, O., Aug. 24.

GALLERIES AS FEATURES OF PROTESTANT CHURCHES.

[From the *Builder.*]

IF a Protestant church be chiefly to preach and hear a sermon in; if the reading of the prayers and administering the communion ought to be performed in the sight and hearing of the whole congregation, and there be no separation of the clergy and laity recognized therein: then it follows that such church should afford a compact open space the bounding lines of which are almost equidistant, front and flank, from the pulpit placed near one end, — square, polygonal, circular, — a form, in truth, the very antithesis of what is now in general use, and everywhere being erected; in fact, a building in which to celebrate the worship of Protestants, whose genuine ritual observances, as Barrow says of Christianity, being few in number, in nature simple, has no business with a clerestory, which is entirely unmeaning in it; and it cannot dispense with a gallery, — a feature which the natural limitations of the human voice render essential to it, — if enormous waste of money in building is to be avoided; for beyond a certain limited number it is not possible to accommodate a congregation that is to be entertained through the medium of the ear rather than the eye, on one level. This truth is referred to, if I remember rightly, in explaining his object in the plan of St. James's Church, Westminster, by Sir C. Wren, who was well aware that his fifty London churches would not suffice for the demand, should he set his face against galleries, which he did not, for they all with but one exception have galleries. The Wesleyans and Nonconformists also are aware that they would have to build nearly twice as many chapels, were they to dispense with galleries.

Mr. Garbett, in his excellent "Treatise on the Principles of Design in Architecture," calls the gallery "an odious requirement of modern parsimony." I am loath to differ from so judicious a writer; but I can conceive a gallery being inserted from quite a different motive to parsimony, — viz., to bring within hearing distance of one man as many as could be decorously seated for the purpose, which could not be done without it. Take out the gallery of most churches or chapels, and extend the ground floor in any direction to receive the displaced seats, and these would be beyond the range of the preacher's voice. As the voice will not go forward beyond 70 or 80 feet, and *will* rise more than 5 or 6 feet, the height of the ear from the ground, the idea of extending the accommodation on a vertical line will naturally occur without the promptings of parsimony; the idea would occur where funds were unlimited and ungrudged. It is as natural a way of increasing the seeing and hearing accommodation in churches, as it is in theatres and opera-houses, where usually there are some half-dozen galleries, or in great libraries and museums. It is as natural to erect a gallery in a church as to build an upper story to a house; and there is no more reason for confining church accommodation to the ground-floor space than to restrict dwelling-houses to one story, or ships to one deck. This is so obvious that the wonder is that churches generally have not two heights of galleries rather than no gallery at all.

It is incumbent on those who dispense with galleries, to show that there is something irreligious in a gallery, or that He who has promised to be present where two or three are gathered together in His name, made an exception in the case of the worshippers being arranged in two tiers, or one above another.

If a gallery is not objectionable on religious or ecclesiastical grounds, which should be one and the same thing, it should not be on architectural grounds; for it cannot be very inimical to beauty or due expression of solemnity. That a gallery is no very great impediment to architectural beauty, many existing churches and chapels will testify, — St. Martin's-in-the-Fields, for example, and most of those of Wren, who made galleries harmonious features of his designs. These are Classic in style; but the gallery is more congenial to the nature of Gothic than it is to Classic; *multitude* being a principle peculiar to the Pointed style, which admits of and rejoices in a division into small parts; and it would offer justification of the tripartite disposition which is not inseparable from the clerestory, the exclusion of which would necessitate more of that perpendicular elevation of wall so essential to dignity.

The introduction of galleries would give the Gothic style an opportunity of showing so far a new phase, and making a step in advance, — like the pushing out of a new limb of an animal in the geological theory of progressive development. It would rectify the plan and vertical section of churches, which are both now generally, in every respect, the reverse of what they should be. They belong to the church system of the Middle Ages, to ecclesiastical principles and usages which are not recognized by Protestants.

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A simple compact form, nearer to that of the chapter-house or lady-chapel, which is often a model of architectural beauty, than to that of the entire cathedral, which too many modern churches affect, is as susceptible of all the chaste beauty and solemnity befitting a sacred edifice as any cross-plan, Greek or Latin. There is no limit to the beauty of which it is susceptible in the way of decoration and character, which the grace of superior fitness must enhance: the gallery front may have a fairy lightness, and its soffit or ceiling, as well as that of the church, may be a complicated and beautiful geometrical problem.

But I am sorry to observe not only the omission of the gallery in new churches, but its removal from old ones, which is a still greater mistake; for the gallery of an old church is as interesting archæologically as any other feature, as a natural outgrowth and development of time and ecclesiastical progress, indicating as it does changes therein made in sympathy with revolutions in the religious feelings and opinions of the people, as represented by the Reformation, rise of the Puritans, and great Civil War; viewed in which light it is a connecting link between the Mediæval church and the present day, and a chapter in architectural and ecclesiastical history. The gallery, more than any other, is a feature adapting a church to the requirements of the present day and the Protestant religion; and the removal of it is throwing the church, so to speak, centuries back, and re-adapting it to bygone times. Very often, I grant, you find a Dissenters' chapel with too wide a gallery, which has a smothering effect upon the place; but very little in regard to seat-room is gained by this, and generally a sacrifice of one line of seats would have made all the difference, and secured an open airy chapel instead of a choked-up one.

Galleries were first inserted, both in churches and chapels, for the best possible reason, viz., to bring the greatest number of persons possible within the sound of the gospel at a given cost in each case, generally the utmost sum available for the purpose; the harvest being plentiful, but the laborers few. The same reason exists still; neighborhoods destitute of churches being known to exist everywhere, to a large extent even in London. Taking out galleries is increasing the destitution, and is tantamount to pulling down churches; removal of the galleries from two churches is almost equal to the destruction of one entire church, for it is only very rarely it can be done without reducing the seat-room below the demand. At St. John's Church, Chester, which lost its galleries a few years ago, owing to its great size (having been a cathedral in Catholic times) sufficient seat-room was obtained on the ground-floor. But it lost much of its archæological interest. The interest of its Norman architecture was not increased, while the link that united the Norman and Pointed church to the present day is wanting, and the latest chapter of its historic record destroyed.

SAMUEL HUGGINS.

NOTES AND CLIPPINGS.

FIRES. — The culpability of those who compel workingmen to risk their lives in flimsy buildings has been once more shown this week by the terrible fire in New York on the 3d inst., by which some fifty buildings were destroyed, causing a loss of about half a million dollars. But worse than the loss of property is the loss of life, which is variously estimated at from ten to as many as a hundred lives. The last estimate might be thought exaggerated, were it not that the conditions were peculiarly hostile to those who were imperilled; and we all remember that the first account of the Brooklyn Theatre fire stated that only a few lives had been lost. The buildings destroyed were mostly factories and tenement-houses. The fire started in Hale's piano factory, where a workman left a pot of varnish unwatched for a moment on a stove. This building was eight stories high, and contained at the time of the fire about two hundred workmen, most of whom were employed in the stories above the one — apparently the second — in which the fire caught.

Another case of culpability, though of a different nature, is reported from Paris, Tex., where on the 31st ult. a man, stating his intention of burning down the town, poured oil on the floor of a saloon, and set it alight; so well did his plan succeed, that the one fire-engine of the town could not extinguish the fire; and consequently hotels, offices, stores, and dwellings were destroyed, causing a loss of a million dollars. Several lives are reported to have been lost.

ACCIDENTS. — The floor of a side-building attached to the Dye Works of Mr. Somers, over Cooper's Creek, near Philadelphia, gave way on the afternoon of Aug. 28, from the pressure on it, burying one of the men in the ruins. When taken out, it was found that he was badly injured.

Another criminal accident is reported from Cincinnati, where workmen excavating for the foundation of a new building undermined the foundations of the adjoining building so as to cause its fall. Four women were buried in the ruins, one of them being dead when taken out. Two men were killed outright, one of them the foreman of the work; and five or six other persons were injured, some of whom are not expected to recover. The owner of the wrecked building had been told on the preceding day that the building was unsafe, but he neglected to warn the inmates. It was not until the building was in a very dangerous condition that any attempt was made to shore it up.

THE KENTUCKY NATURAL BRIDGE. — It is said that the Natural Bridge, whose fall we chronicled a short time ago, was blown up by some malicious person. It spanned a tributary of the Little Sandy River, 150 feet wide, and was 90 feet above the stream.

THE INDIANA STATE HOUSE. — The experts appointed to examine the plans for the new State House have made their report to the commissioners, but it has not yet been made public. It is quite certain from what can be learned, they have rejected all the designs. This reflects well on the gentlemen appointed to make the examination, Mr. Lee, the architect, and Major Smith, C.E. Mr. Allen, the builder, refused to act with them, and prepared a lengthy document defining his position. The commissioners will continue in session until a decision is made. Unless they reject the counsel of the experts, they will call for a new competition.

BUILDING IN THE SANDWICH ISLES. — The Honolulu (Sandwich Islands) *Advertiser* of Aug. 11 says: "In consequence of the new plantation enterprises on the different Islands, as well as the considerable amount of building going on in Honolulu, there is just now a demand exceeding the supply for bricklayers, masons, and carpenters. It does not follow, however, that a large immigration of skilled mechanics would find ready employment here; but still there is room for a few more, who would unquestionably obtain fair wages for some time to come."

FINDING EMPLOYMENT ABROAD. — Within three months about 300 carpenters have sailed from this country for England. On Aug. 28 twenty-five more carpenters sailed on the "Wisconsin," of the Williams & Guion line. They have made a contract with building firms at Manchester, England, for three years' service. They will work eight hours a day, and receive wages equivalent to $3.50 in currency. A half-holiday on Saturday will also be allowed. The expenses of the trip across the ocean will be deducted from their wages in easy instalments.

THE SOLDIERS' AND SAILORS' MONUMENT, BOSTON. — The bronze statue representing the genius of America now crowns the new Army and Navy Monument in Boston; and the figures of Peace, History, the Army, and the Navy, have been placed in position. The bas-reliefs which are to occupy the panels are four in number. The first one represents Gov. Andrew and staff on the State House steps, reviewing troops at the outbreak of the war; the second, the troops passing by Gov. Andrew and staff on their return from the war; the third, the Sanitary Commission making bandages, with soldiers putting their wounded companions into the ambulance wagon; the fourth, a naval engagement, in which a monitor and man-of-war are coming up a river and firing upon the fortifications.

THE INTER-OCEANIC CANAL. — The *Engineering News* says that Lieutenant L. N. B. Wyse, U.S.A., has made a report on the Darien survey in the interest of the Nicaraguan project. The gorge of the Tihule is found to be 450′ above the lowest tides, so that hopes of a lockless canal through a gap between the Cordilleras are groundless. A tunnelled canal is also out of the question; but instead a canal sixty-five miles long is suggested, which would start at Real de Santa Maria on the Tuyra and go to the Atrato. The highest level by this route would be 160′. This route is said to be better than any that were surveyed by Commodore Selfridge, and to be in many respects superior to the Nicaraguan line. Lieut. Wyse also suggests a canal without locks, but with a tunnel, the cost of which would be about $4,000,000 per mile. This canal would start from the Chuncunaque river just above Yaviza, and then follow a straight line along the course of the Tupisa river, across the Cordilleras, and open into the Atlantic just below Point Gandi.

OBITUARY. — We regret to learn that Mr. John T. Dexter, a well-known *litterateur*, died in London on the 13th of August. He was an Englishman by birth, and thirty-six years of age at the time of his death. Mr. Dexter was for some years the private secretary of Sir Charles Dilke, M. P.; and his relations with the latter and other prominent English politicians thoroughly familiarized him with the inside workings of the political world. He was especially familiar with the great question which is now agitating England in reference to the consolidation and reform of the government of the metropolis, and wrote and spoke frequently, and with great clearness, upon this complicated subject. He was a regular contributor to the London *Athenæum* and other leading English periodicals, and for several years acted as the regular London correspondent of the Philadelphia *Evening Telegraph*. He was also a contributor to some other American periodicals, including the *American Architect and Building News*, for which he wrote the instructive series of papers on Ceramics at Philadelphia. Last year he visited this country, and remained in Philadelphia during the greater part of the Centennial as the correspondent of English journals. Mr. Dexter was a master of good English, a ready and attractive writer, and a fluent speaker.

CLEOPATRA'S NEEDLE. — In order to determine the best site for the Egyptian obelisk, wooden models of it have been erected on different eligible sites in London.

FIRE AT VENICE. — It would seem that a fire occurring at Venice would be easily extinguished; but recently a building full of valuable objects was almost wholly destroyed by fire because the pumps would not work, and want of discipline prevented the forming of a chain of bucket-passers. The *Gazetta del Veneto* says: "Let not those whose duty it is forget that Venice is rich in monuments and masterpieces of art in whose preservation and safety the whole of the civilized world is interested. Let us, above all, not forget the fire of SS. Giovanni e Paolo."

WARMING AND VENTILATION. — Flavitsky uses double windows, placing an air-chamber under each window, into which the fresh outside air is admitted, and heated by ribbed tubes, by means of water or steam. The hot air rises between the windows, and enters the room near the ceiling.

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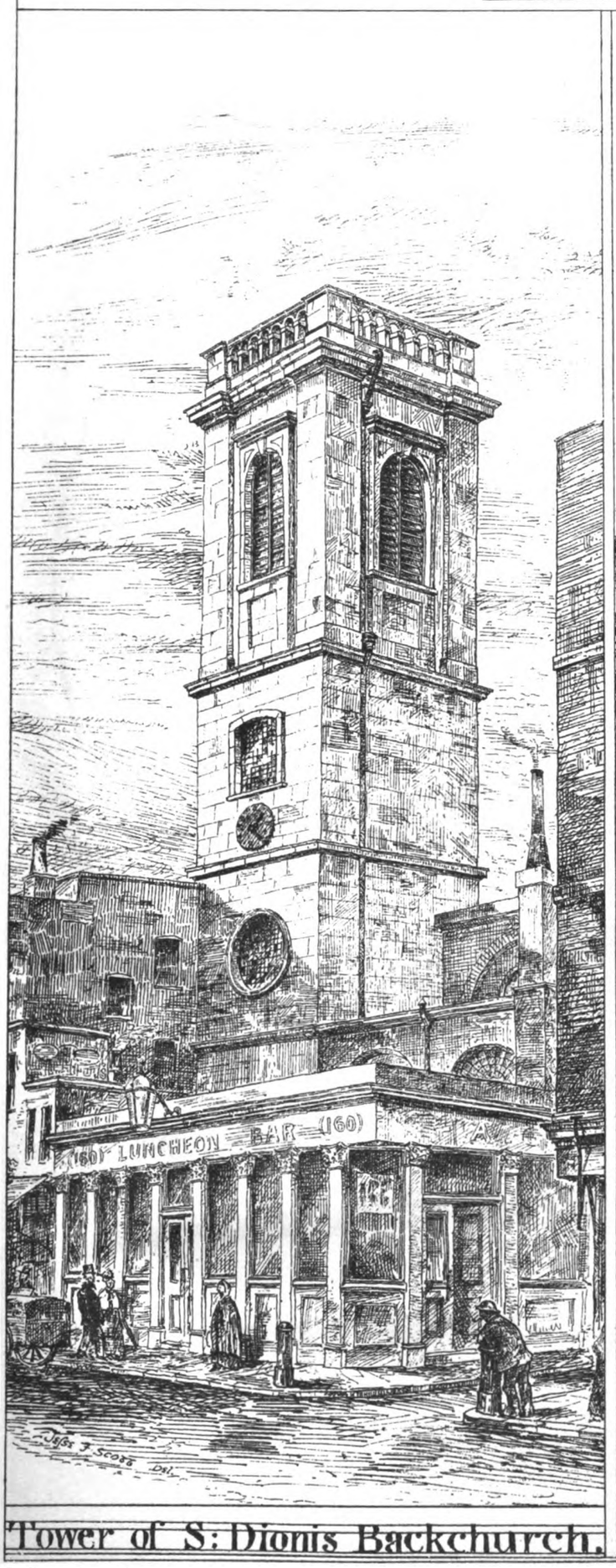
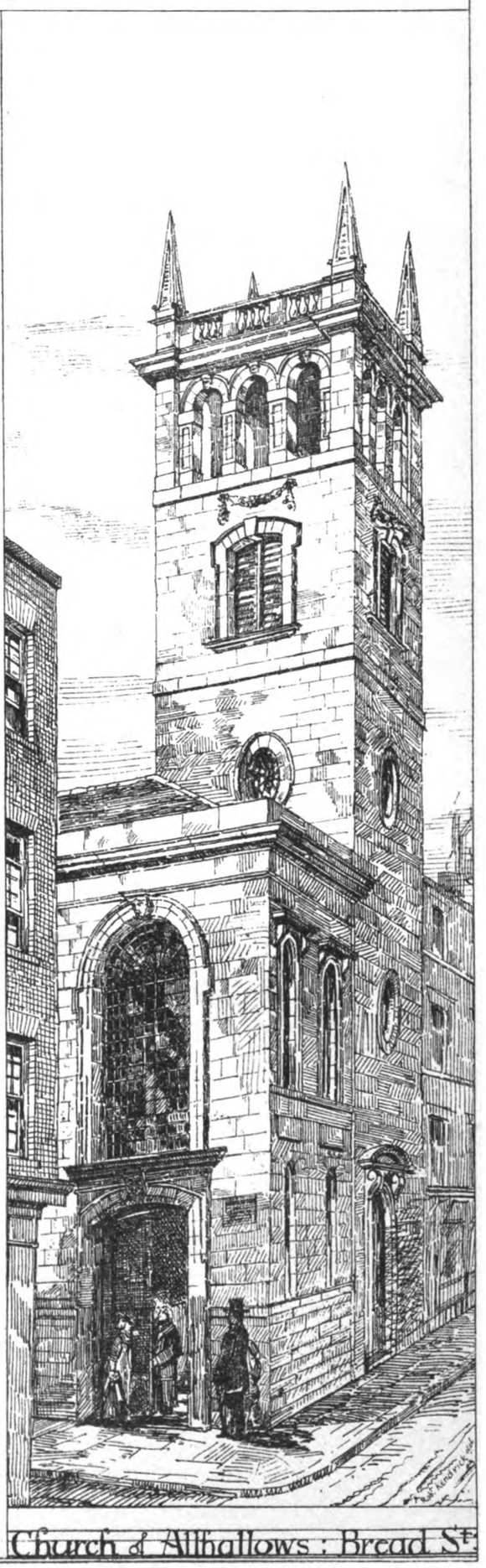
Two condemned City Churches

London.



Tower of S: Dionis Backchurch.



Church of Allhallows: Bread St.

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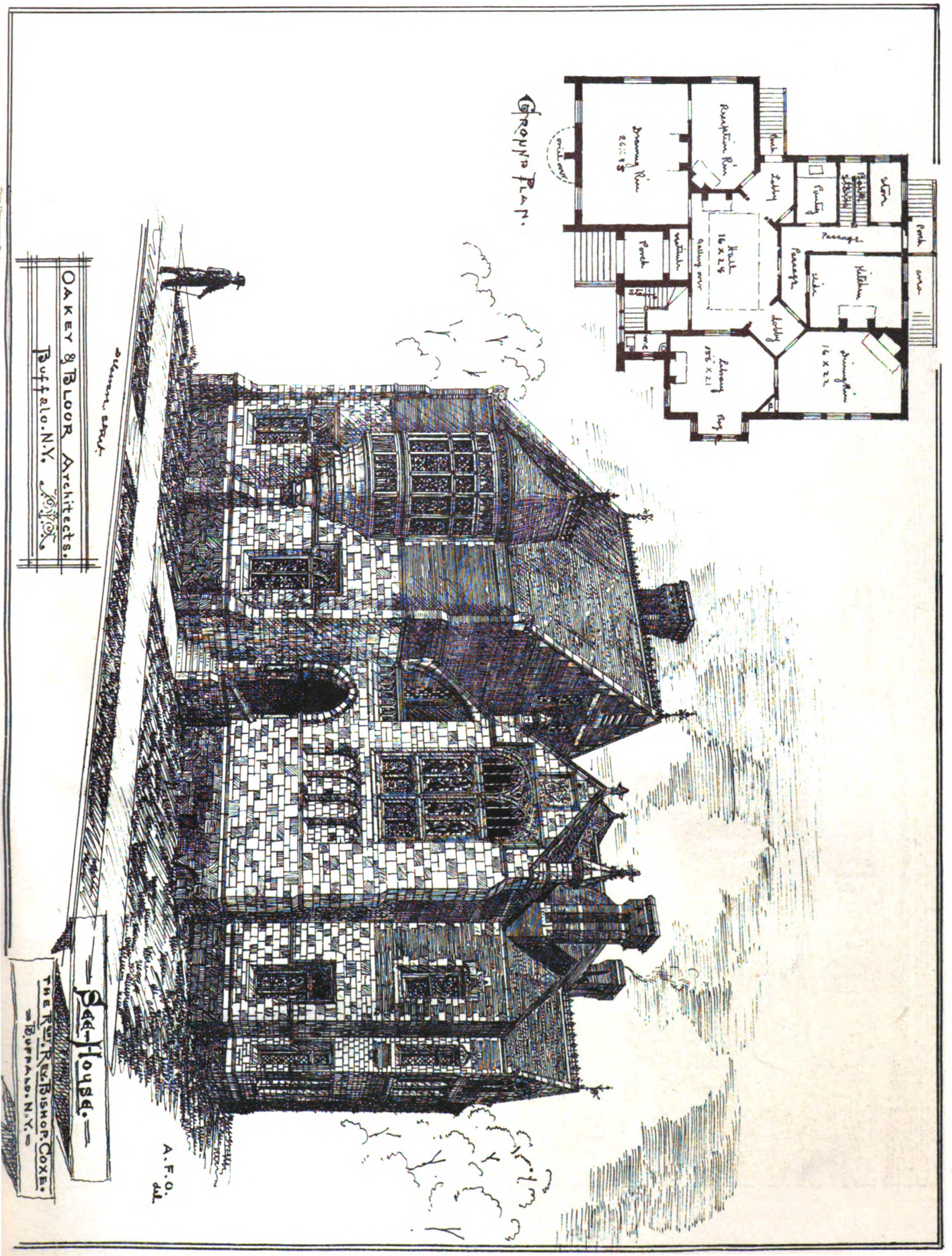
GROUND PLAN.
OAKEY & BLOOR, Architects.
Buffalo, N.Y.
Side-House.
THE REV. R. W. BISHOP COXE.
BUFFALO, N.Y.
A.F.O. del.

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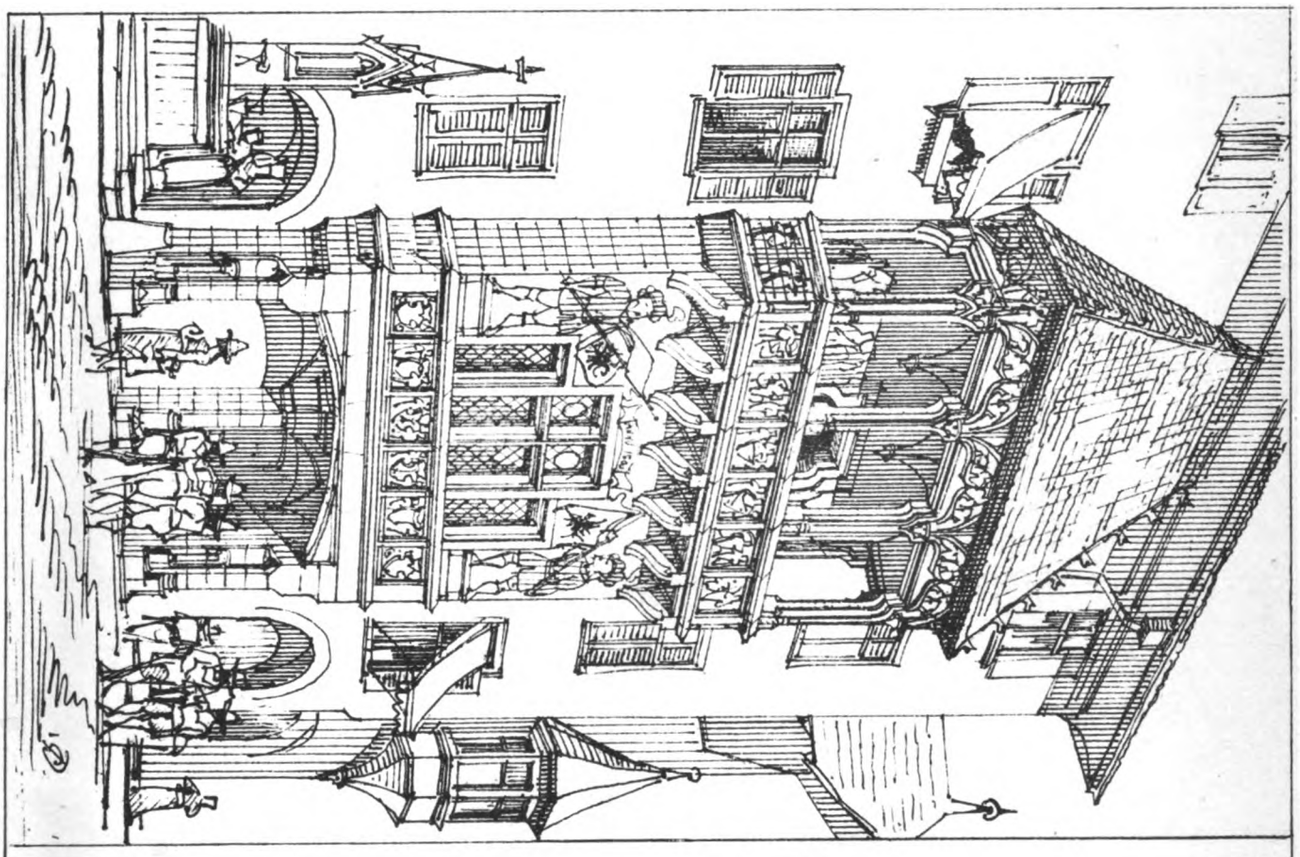
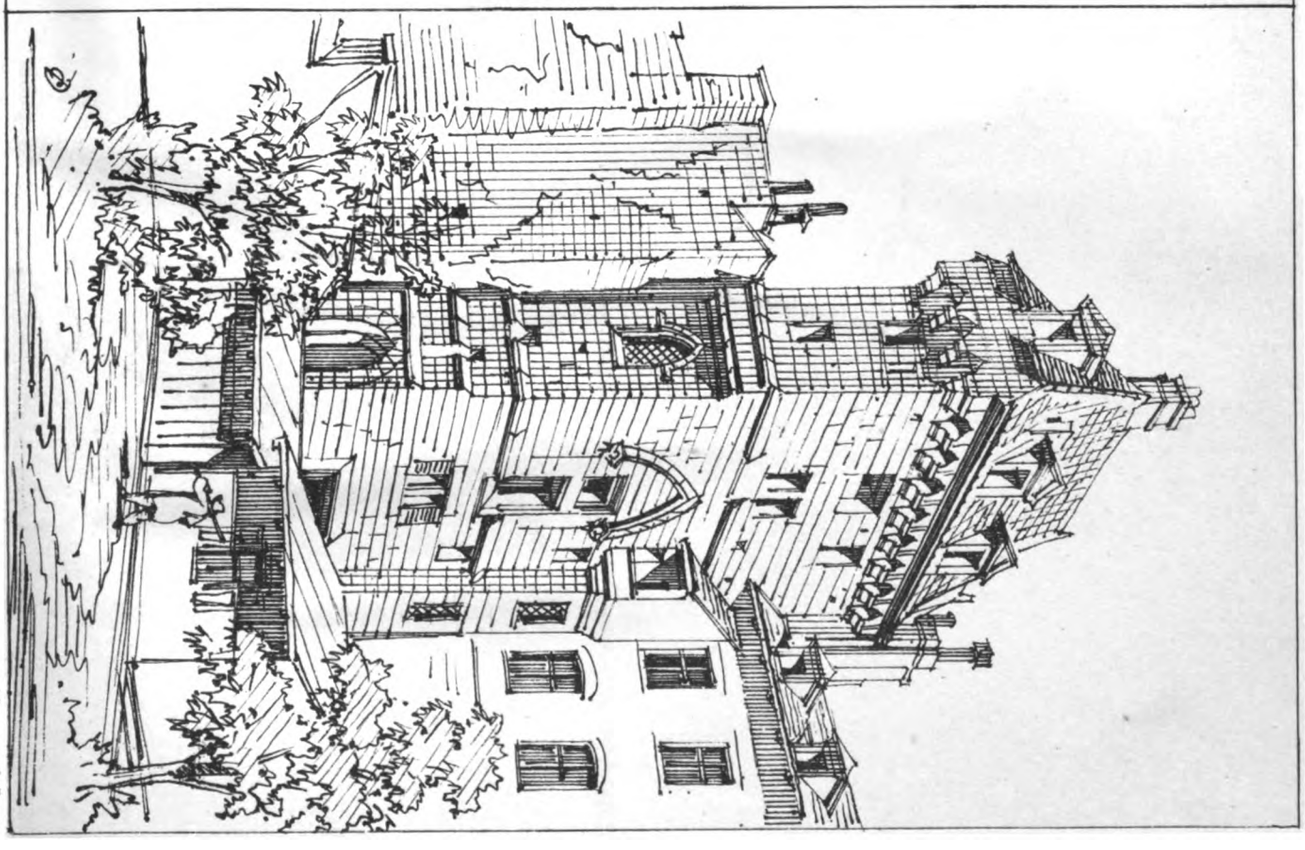


— THE GOLDNE DACHL, INNSBRUCK. —



— THE TOWER OF JEAN SANS PEUR, PARIS. —

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, SEPTEMBER 15, 1877.

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THE approach of the season when the various Chapters of the American Institute of Architects begin for the winter their regular monthly meetings, warns us to note the fact, made more obvious by recent events and investigations, that if true to their trusts, they have an abundance of very serious work laid out for them. If they appreciate their responsibilities they will have no reason to complain of want of business. We fear that the reports of the Chapters at the forthcoming convention will, as heretofore, appear mostly as perfunctory documents, setting forth in many cases an unproductive routine of stated meetings during the past year, and bearing upon their face evidence of the difficulties of obtaining quorums, or, if obtained, of arousing an active interest among the members. Our columns have too rarely contained reports of the proceedings at these meetings, or of papers read and discussions held at them on subjects of professional or public interest. The first business of the Chapters would seem to be to take vigorous measures to multiply the number of their members, so that their wheels may not be so often blocked by the impediment of "no quorum." To this end we believe that the convention will show an increasing disposition to smooth the way by so adjusting the matter of costs and dues, that this alleged obstruction to membership may be rendered of less effect. We shall be interested to learn the result of the experiment in the reduction of annual fees, as voted at the last convention. The business for each meeting for the season should be carefully laid out by a committee of the most active and intelligent members, so that each senior and junior member may feel that he is to bear some stated part in the winter's work. Experience has shown clearly enough in all associations combined for mutual improvement, that their business will not take care of itself, and, if not regularly provided beforehand, the proceedings will be very sure to degenerate into mere *conversaziones*, doubtless very agreeable in themselves, and not without influence in promoting a necessary and wholesome feeling of good fellowship; but in these social pleasures, the grave responsibilities of our position as professional men organized for active service in the midst of a society which needs our best combined services, are apt to be overlooked. It cannot be doubted that the Institute, admitting all that it has accomplished, has not fully availed itself of its opportunities. These are many and various, but perhaps the most obvious among them may be enumerated as follows: to encourage a more intimate relation between art and the various industries which are employed by architects in their works; to promote a spirit of discussion, criticism, and analysis among themselves; to give greater efficiency and wider scope to the building laws, especially in view of the constant admonition to change in them given by fire and fall; to improve the dwellings of the working classes; and in short to so order their proceedings that architects may be encouraged to feel that the work they are engaged in is not a mechanical occupation, or a mere business, but an art which is the direct agent of civilization, and which not only maintains but elevates and refines those who pursue it.

THE fall of a house at Cincinnati by the undermining of its walls in the excavations for the construction of an adjoining building, and the great fire of the 3d inst. in New York, on Thirty-fifth and Thirty-sixth Streets, by both of which disasters many lives and much property were needlessly sacrificed, are fair examples of that succession of tragedies which will continue in the future as they have continued in the past, at irregular intervals, so long as our building laws remain unimproved and the execution of them is intrusted to the discretion of politicians. In the former case, the coroner's jury has brought in this remarkable verdict:—

"The deceased came to their deaths from injuries received from the fall of a building at No. 74 Longworth Street, and we further find that the result of said accident was due to bad material used in the construction of said building."

This is a conclusion obviously insufficient. It is true "crowner's quest law," and carries with it no beneficial or remedial results. As regards the New York disaster, we believe that the jury has not yet brought in its verdict, and, in the absence of complete testimony, we are not prepared to point an appropriate moral with regard to it. But it is evident that these verdicts are rarely comprehensive enough to bear their proper fruitage. It is, however, competent for architects to draw large and instructive conclusions from every such disaster. It is for them to improve the opportunity, and while the accident is fresh in the minds of the public, to urge such necessary amendments to the statute, and to the execution thereof, as shall secure immunity in one direction at least. These amendments, as they accumulate, must carry with them the spirit of reform in all our methods of building. Thus the control of this spirit must rest with the associated architects if they are duly vigilant, courageous, and intelligent. It should never be forgotten that these accidents by conflagration and fall are the opportunities of good architecture.

IN the last number of this journal (p. 286) we summarized a portion of the new Government Building Code, prepared under the advice of the Royal Institute of British Architects, for the use of the sanitary authorities in the various towns throughout England. The portions to which we referred included regulations concerning streets, walls, foundations, roofs and chimneys. Our contemporary the *Architect*, of Aug. 25, contains an abstract of the remainder of these important regulations. They require a clear distance of at least 24 feet between the frontage of opposite dwelling-houses, and in the rear of each house an open space of not less than 150 square feet; the lateral boundaries of the lot to be from 10 to 25 feet from the building, the distance increasing with the height of the building. They require windows on all sides for ventilation, one or more for every habitable room, having an aggregate glass area at least equal to one-tenth of the floor area, and each window arranged so as to be opened at top one-half its own area. They also require a ventilated space of three inches between wood floor-beams and concrete in basements; and every habitable room without a fireplace and flue is to have ventilation by an air-shaft of at least 100 square inches. It provides for the subsoil drainage of damp sites separate from the house drainage; house drains to be not less than 4 inches internal diameter, with water-tight joints, to be laid in concrete beds and (if it can be avoided) not under buildings; to have regular fall, straight direction, branches entering obliquely, and the whole trapped near the sewer or cesspool with which they communicate; every such drain to be ventilated at two points as far apart as possible, one by a pipe opening at surface of ground and the other by a pipe opening at least 10 feet above the surface, one of these pipes to be near the trap aforesaid, and all the ventilating pipes to be at least equal to the area of the drain with which they are connected. Soil-pipes are required to be at least 4 inches in diameter, to be fixed outside the building, to be carried up without bend, to be open at top, and to have no trap, except in immediate connection with the connecting water-closets. Waste-pipes from kitchen sinks to be trapped and to connect with drains; other waste-pipes to be taken through external walls, and "discharged in the open air over a channel leading to a trapped gully-grating at least 18 inches distant." Water-closets are to be against external walls, to

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have windows and other ventilating appliances, to have separate cisterns arranged for flushing the pans, and no "D" traps. Privies to be at least six feet from dwelling-houses, to be ventilated near the top, to have paved floors inclining towards doors, to have no connection with drains, to be arranged so that vaults or receptacles may be readily cleaned, and fitted to receive dry earth or ashes. The regulations are explicit as regards the construction of ash-pits or places for the deposit of dry household refuse. Cesspools are to be kept at a certain distance from the house, to have no connection with sewers, to be easily accessible, to be built of masonry in cement, and ventilated. It will be observed that these regulations, so far as they are concerned with the sanitation of dwellings, are similar to those of Denton, described more at length in our fourth article on Sanitary Engineering (p. 288).

WE again heartily commend these By-Laws or regulations for building to the attention of all interested in sanitary matters. They are the product of a high state of civilization. No people can claim to have reached the standard of true well-being until they shall have submitted their households to well-considered sanitary rules, after the manner of those provided by the English Government for the instruction of their local sanitary boards. Free schools, free libraries, free churches, and the right to vote, — these we have, together with all the requisites of civilization which the possession of these institutions implies; but until our houses are made safe and wholesome, we are not fitted to receive all the blessings of intellectual, moral, and political freedom. We have building laws for our great cities, — all more or less imperfect, — but all under the pressure of the great public admonitions of fire and disease, gradually taking shape, so as to procure for us the ordinary conditions of security. But in the smaller towns and villages, as we have taken occasion to observe, these conditions are almost wholly neglected. It will be observed that the English rules are simply model by-laws, for building and drainage, recommended for the acceptance of the local authorities. When such information is promulgated, at least the excuse of ignorance is removed, and boards of health, selectmen, and supervisors, are furnished with an incentive for action, and with a basis of sound regulations. For application to our own necessities, the scheme seems to be practicable and moderate. With this object, we venture once more to recommend the Chapters of the Institute to take up this interesting question at their meetings next winter, referring them to the excellent abstract of the English code contained in the numbers of the English *Architect* for Aug. 18 and 25. We need hardly say that our columns will always be open to discussions of this subject.

WE now learn that the Trustees of the Institute, in asking the various Chapters for an expression of opinion regarding their Resolutions on the Washington Monument question, did not intend, as we were informed by the abstract from the minutes with which we were furnished, to act upon such expressions at their meeting of Sept. 6, but to lay them before the approaching convention for final action. These resolutions, it will be remembered (see p. 285), proposed a public competition in which various exceptional concessions were made not contemplated in any expression of opinion on the subject of competitions yet made public by the Institute. They are in conflict with the best interests of all parties, the public and the competitors alike, and, if finally adopted, will be full of danger to the profession. But we have no fear of any such result, and we do not believe they would have been proposed for the consideration of the Chapters, if the Board had realized that, in allowing a liberal and good-natured concession for the sake of satisfying a temporary interest, they were making a sacrifice of vital principles which should be permanent and which should be maintained with dignity. We beg leave to refer the Board to the fifth chapter of the Tract on Competitions, reported to the Institute by the Committee on Professional Practice at the Ninth Convention, and published with the Proceedings of the Tenth Convention. This Tract has been printed separately by the Institute, and should be sent to every committee which has it in contemplation to invite a competition of architectural designs. It covers the ground in the interests of all parties more thoroughly than any other paper or treatise within our knowledge; and it contains an expression of principles which should not be abandoned by architects, much less by the Institute of Architects, save under the most exceptional conditions.

THE Boston *Daily Advertiser* of the 3d and 4th inst. contains a remarkable letter addressed to Stephen Salisbury, jun., Esq., of Worcester, from Dr. Augustus Le Plongeon, concerning the archæological researches in which he has for a long time been engaged among the ruins of Yucatan. The ancient city of Chichen-Itza, to which he especially refers, contains, it appears, among its vast architectural remains many very curious carvings and inscriptions which seem to offer to the student new clews to the solution of the strange resemblances in manners, religion, arts, and language between the prehistoric tribes which dwelt in these mysterious regions at least 6,000 years ago, and the ancient inhabitants of Europe and Asia. Dr. Le Plongeon, however, develops one point of peculiar interest indicating perhaps that this people anticipated in those dark ages an invention which is the proudest boast of our own. He was led to this discovery by the statement of a very aged Indian who, repeating to him some of the traditions concerning the place, called to mind the story of a certain inscription upon a certain house in the ruined city, which set forth that "a day would come when the inhabitants of Saci (Valladolid) would converse with those of Ho (Merida) by means of a cord that would be stretched by people not belonging to the country." Some months later, on searching among the remains of the city, he found a building, realizing the description contained in the narrative, with eighteen rooms, and over the doorway of one of these rooms a lintel stone on which appeared inscribed a cord connecting the mouth of a face in the right-hand upper corner of the slab with the ear of another face carved on the opposite corner; the upper face representing the people of Saci, and the lower face the people of Ho, who dwelt in lower places on the plains. Near the upper station four zigzag lines converged on a common centre, and the middle of the cord itself was broken by a similar conventional sign of lightning. The natural inference drawn by our antiquary was of course that the electric telegraph was known to the Itza sages 5,000 or 10,000 years ago; and that this slab will prove to be a new Rosetta stone giving at last a definite clew to the deciphering of the inscriptions in the ancient Maya tongue, which is still spoken by the Indians of Yucatan.

IT is the aim of this journal, in preparing and arranging the illustrations for each number, to present not only a continuous and varying record of the best available architectural works in this country, but also, for the sake of contrast, and because of the instruction and incitement which they may afford, the more unusual architectural productions of the Old World, whether of ancient or modern times. In realizing this policy the most serious obstacles which we encounter as regards the former class are the occasional indifference or unwillingness shown by architects who are engaged upon important works, when requested to submit their drawings for publication, and the difficulty of selecting from among the many sketches and studies which are sent to us, without giving serious offence to those whose drawings for various reasons we are constrained to return. These rejections are frequently made because the drawings come to us in such shape and condition that, should we attempt to reproduce them without fundamental and costly changes in their style and handling as works of draughtsmanship, we should be doing injustice to their claims as works of art; and frequently because they present a character of design which we have so often repeated in our pages that we are compelled to set them aside in favor of others whose originality will give a larger scope and a more interesting variety to our record of the current events of architecture. But it occasionally happens that when a work of conspicuous merit has been built, we are unable to obtain an authentic drawing of it; and our record must remain to that extent incomplete. We are not disposed to analyze the motives of those who thus withhold their assistance, except so far as these motives may be induced by a distrust or dislike of that mechanical process of reproduction to which we are confined. We admit that there has been no little reason for dissatisfaction in this respect in

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the past; but we must beg our friends to acknowledge in their turn that our pages have of late indicated a conspicuous advance in the quality of this work, especially in those cases wherein the character of the drawing has been such as to lend itself readily to the processes. For want of time to prepare a substitute, we are occasionally at the last moment compelled to print a drawing which promised well but turned out ill; but on the whole, through a system of careful rejection on our part, and greater care and attention in preparing and printing the plates, we think we may now compare favorably, in respect to the clearness and finish of our illustrations, with our older and more experienced contemporaries in England. What can be accomplished by careful handling, may be best marked perhaps by the reproduction of the delicate steel engraving of the grand staircase of the new Opera House at Paris in the present number, which we request our doubting friends to examine with a critical eye, and no longer hold back from us that assistance which we need in the successful fulfilment of our mission.

CORRESPONDENCE.

THE NEW STATE CAPITOL AT HARTFORD. — INEBRIATE ASYLUM. — MONUMENT.

HARTFORD, CONN., Sept. 3, 1877.

IF the appearance of the new State Capitol now building in this city is unknown to anybody in Connecticut, he has but himself to blame. What with the arts of lithography, photography, and engraving, coupled with the generosity of the architect and commissioners, the distribution of the view which represents the building in its entirety has been universal; and the edifice has been built in the minds of the people throughout the land. The people can thus see what they are paying for, which certainly is a good thing; but as an art educator it is next to possible that they might do better. Comparisons are "oderous" as Mrs. Malaprop says; and yet upon seeing the present Capitol, one cannot help turning back a page or two in the history of the State project, to the time when the first architectural competition for the building took place. This was in 1872; when in response to the invitation of the commissioners for plans whose execution should not exceed $900,000, a number of designs were sent in. Boston and New York were represented as well as Hartford, and one set of drawings on their way to this city from California was snow-bound in the Rocky Mountains. Probably at no previous time did the city press blossom out so fully with art criticism as during the public exhibition of these works. The papers fairly teemed with architectural articles calculated to "educate the people" up to a proper consideration of the manifold beauties of one design, or to point out the unpardonable faults and gross absurdities of another; but above all there was to be no useless expenditure on the part of the State, and the sum mentioned was to be the strict limit for the cost of the Capitol. A second competition was instituted. A great amount of skill in planning, of thought and study in arrangement, and clever work in design, marked the efforts of both these competitions. At the second and as it proved the final one, eleven sets of drawings were exhibited, Gothic being the prevailing style of the work. This exhibition took place in March, 1872, at which time the appropriateness of Gothic for public buildings was discussed at great length in the city papers. Upon the commission were no members conspicuous for their architectural knowledge, with perhaps one exception; and beyond the decision of the board there was no appeal. The pros and cons of the various designs were considered at length, and the usual hearing given the architects, after which the award was made: it was not conclusive however until material changes were effected in the design of R. M. Upjohn of New York. We hear of important decisions hanging by a single thread. This one hung by a dome. The journalistic debates on this feature were something remarkable; and as the discussion rose higher and higher, the tower which originally crowned the building fell lower and lower in public estimation. Tradition — American tradition — pointed to a dome. State Houses always had domes, the new State House at Hartford must have a dome. This was about the pith of the reasoning: consequently a dome was ordered, and will be built, despite the fact that the prime mover in bringing about the change is now dead, a noted clergyman whose good offices are, as a gentleman of the city recently told the writer, "more than counterbalanced by causing the Capitol to be built with a dome." This may be taken with some qualification, as an index to the feeling of a portion of citizens on this subject.

The Capitol is designed in what the architect calls "modern secular Gothic." It is two and a half stories high, and has a frontage of nearly 300 feet upon the City Park, the building standing upon the grounds lately purchased from Trinity College. The recent removal of one of the college blocks opens up from the street below a fine view of the eastern side of the Capitol, which is perhaps the most effective point from which to behold it. The general ground plan is in the form of a parallelogram whose lines are chiefly broken by the projection of the main central portion, whose total length is about 200 feet; the park façade being treated with an arcade through which is the principal entrance, and the south projection embracing a *porte-cochère* and ample vestibule, above which is located the Represeutatives' Hall. On the same story, — a mezzanine story — in the eastern wing, is the Senate Chamber. The Supreme Court room and the State Library are upon the first story, or what is commonly styled the second floor, the library having an excellent north light. The court-room is situated in the extreme west wing. The customary office for the State authorities, the Governor's suite of apartments, and the various rooms for commissioners, etc., occupy for the most part, the main wings, and are conveniently located for the various purposes for which they are intended. Two large skylights admit light into the corridors in the intermediate portion of the wings, between the main building and their extremities. The extremities of these wings have their length at right angles to the adjoining portion, and are externally treated with gables, flanked by circular turrets and pierced with a wheel window, the composition being a vague suggestion of certain public buildings recently erected near London. The various roofs of the building are generally constructed with a high pitch, and the dormers with which their lines are broken present a dull monotony of design. There is no lack of corner towers. These rise from the main building, and are finished in a nearly uniform style, the roofs being of pyramidal shape, with terminals of copper and iron.

When this design for the Capitol at Hartford was placed on exhibition in New York, some time ago, it fell under the eye of a critic who smartly suggested that the architect "had dined on Gothic, with an *entrée* or two of French châteaux and a dessert of Renaissance, and had then gone to bed and dreamed this horrible nightmare!" Whatever may have been the case, and whatever the source which suggested this composition, while undoubtedly it has merit in some respects, still one great defect in the design is conspicuous and will remain so despite dreams, present, past, or future. We refer to the lack of imposing effect. The elements are not wanting: there are good heights and ample dimensions, wealth of detail in some instances, solidity of material, and a certain amount of variety; but the clever handling, the boldness and spirit which please us in other architectural works whose qualifying adjective is "grand," are lacking in the present instance, and their loss is to be deplored. The poverty of the design nowhere expresses itself more prominently than upon the lower story, which seems to mourn its neglect, and envy the stories above; plain oblong apertures for windows, unrelieved save by a bead and stop chamfer, pierce the walls on this floor, arranged somewhat on the factory principle, and innocent of any thing like harmonious grouping, so often effective in a structure of this character. The ornamental carving seems to have been attracted in spots, and where introduced the display is lavish, almost prodigal. Special effort has been made to render the approaches to the building striking, and to enrich the arcades and entrances to an almost unlimited extent. This is seen at once in the crocketed arches, the elaborate lintels, the carved capitals and polished shafts of the columns, and the delicate patterns of diaper-work. The tympana of the arches are to be embellished; and already a fine bas-relief of the famous Charter Oak has been cut upon a tympanum over the east entrance; and between each arch are corbels with miniature columns, crowned with absurdly large caps. These are intended for the reception of statues. The provision for these marble gentlemen is ample, there being no less than twenty-six projecting corbels. The effect of Connecticut worthies thus distributed and standing each under his beehive-like canopy of marble, will doubtless be unique, and the scene will be a busy one. The major portion of the foliated work of the string-course and the capitals is cleverly done; the designs are good, and the execution is spirited. The models for this work or a part of it were furnished by the well-known New York sculptors, Messrs. Ellin & Co.; and the carving was executed on the site by foreign workmen. Critical eyes, not to say average good taste, cannot fail to notice a want of harmonious proportion in much of the carving, placed at a considerable height from the ground, particularly about the finials of the turrets, and also in those forming the termination for the pedestals of the balustrades. Why balustrades should be used at all and introduced at the bottom of the steep roofs, we do not attempt to explain. The ridges are crowned with a finely designed iron cresting, the full effect of which is only realized by climbing to its level, and then viewing it. The building is deserving of credit in one particular which is not unfrequently overlooked. It presents four façades nearly in keeping with each other; and while three of the number are more elaborate, still the remaining façade (that on the west) is not treated as though, being in the rear, it was of no great importance and consequently called for little or no design. It does not repeat the error made in the City Hall, Boston, for example, whose rear portion is but distantly related to the front and sides. In the present case some allowance should be made in favor of the fact that the rear of the Capitol will doubtless be seen by the majority of the people who visiting the building are attracted by the other elevations. In a large public work of this character, it certainly seems an unpardonable breach of professional etiquette not to intrust the supervision and superintendence to the architect; and the course of the authorities in this respect is open to criticism. If the plan of employing a second party to superintend the erection

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of the building was adopted for the sake of economy, a very plain and homely lesson can be read in the fact that the entire structure, when completed, is now calculated to cost $2,500.000.

The dome is now being built; when finished it will stand some 260 feet high and be crowned by a symbolic figure in bronze. The diameter of the dome is nearly 60 feet. Whatever may be the æsthetic effect of this conspicuous feature externally, internally the vast piles of masonry which support it, and confront the visitor as he enters the north vestibule, are almost appalling; and if the numberless columns about the masonry and the lumbering proportions of the costly marble staircase are included in the same view, the scene will be enough to confuse Connecticut statesmen for years to come. Interior work is being pushed forward with an eye toward the possible occupation of the Senate Chamber and Representatives' Hall by the Legislature at the winter session in January next; and already McPherson of Boston is at work upon the wall decorations. The site of the Capitol is a fine one. The untrammelled nature of the ground, and its commanding elevation above the City Park, render it pre-eminently a good location for a public edifice; and its lofty dome, its towers, and the vast proportions of its marble walls set in a background of rich foliage, unite to attract the attention of the public, not only of the city, but that portion of the travelling public which passes through Hartford daily upon the different lines of railroads.

For several years past, strenuous efforts have been made by a society interested in the treatment of inebriety as a disease, to obtain from the Connecticut Legislature an appropriation of $25,000 to aid in the erection of an asylum. Thus far their efforts have been fruitless; but the initial step of the project has been already taken, and an eligible site purchased. It is about two miles south-west of this city, and is known as "Walnut Hill." Temporary quarters have been leased by the society, and treatment of patients will for the present be pursued in town.

Mr. George Keller has recently received a commission for a soldiers' monument to be built at Manchester, N. H. Mr. Keller's design was selected by the committee, from thirty drawings which were submitted in competition. The monument will probably be of granite, and when completed will cost $20,000.

CHETWOOD.

THE BURNING OF HALE'S FACTORY. — THE APPRENTICES' LIBRARY.

NEW YORK.

THE fire of the 3d inst., at Hale's piano-factory in this city, by which an undetermined loss of life and a destruction of a half million worth of property was brought about, is noteworthy as being the direct result of bad building. No building law, no device or forethought of architect or designer, can prevent the outbreak of a fire; but the merest tyro in construction should know, or a half moment's thought should convince any one, that a great brick shell eight stories high and 197′ x 26′ in plan, with windows in abundance from top to bottom, was sure to become, when fire had once gained a strong hold upon it, a veritable centre of destruction. The side walls were as thin as possible under the law; the floor-beams and roof were of wood, without a single transverse bulkhead wall, but with open stairways and hatchways which afforded every opportunity to the most rapid and unrestricted spread of the flames.

This factory has a history which might appear mysterious were it not so easily explained by a statement of the attempts which have been made to build with flimsy materials and slighted workmanship. It was begun in November, 1870, and pushed on until Dec. 15, when the roof having just been put on, the whole came down in a grand crash, destroying part of the adjoining property, and causing the death of four persons. Haste in building, poor mortar, and thin, insecure walls, were the reasons assigned. An inquest was called, and experts examined. The verdict declared the building to be built according to law, but stated that the law was defective, and recommended various changes looking to the gain of greater security through cross walls and bracing. Mr. Hale, having thus been declared a law-abiding citizen, rebuilt the factory according to the plans and specifications which had been so unluckily followed in the first attempt. The building managed to stand for six years, and then made another exhibit of the penny-wise, pound-foolish policy of cheap construction, in the conflagration which it caused on the 3d instant. The fire had hardly begun when the thin walls burst out, leaving an open space wherein the wind had full play, and sent the flames in every direction. It was the general opinion of all who looked at the high tinder-box, that had the walls been strong, they would have been a protection to the neighboring houses, and very likely have enabled the firemen to restrict the fire to the destruction of this single building. As it was, they gave way at once, and the fire spread right and left without hinderance. The roof proved any thing but fire-proof, igniting like so much paper, and scattering sparks far and wide, starting flames at various points in the neighborhood, and at a distance of several blocks, burning up the Gospel Tent. Egress from the building was extremely difficult, as the staircases and passage-ways were among the first parts of the building to succumb to the flames. In short, all the features of a building on which one would expect to place reliance in time of such emergency proved totally inadequate. The building was constructed not only so as to insure its own speedy and entire destruction in case of fire, but also so as to involve the largest possible number of contiguous houses. At the time the fire started the wind was very high, and continued so during the whole day; and, as the building was perfectly honeycombed with windows, all of which were open, there were continuous currents of air fanning the flames. Iron shutters, which, if closed, might have kept out the wind and smothered the fire in its early stages, were left open, and proved worse than useless. A large amount of inflammable material was stored in the building, and helped to feed and extend the conflagration. There seems to have been no water or other means of extinguishing a fire on the place.

Even while the flames were busy licking up the surrounding property, the Building Department officials were declaring that the factory included every thing it should have according to their notion of building. The original cost of the building was $37,000 in the days of high prices; John G. Prague being the architect, and Samuel Cochrane (since deceased) the builder. The walls were twenty, sixteen, and twelve inches thick, of common hard brick, covered by a flat roof.

The comments of the press upon the occurrence have been severe as they are merited. All unite in condemning the state of affairs under which such a structure could be placed in the centre of a city; and the fact that hundreds of just such foci of destruction exist in New York to-day no doubt added vigor to the comments of the writers. The *World*, for instance, says that, —

"It needs no showing that a city in which such a thing as this can happen, and happen repeatedly, whatever its pretensions may be, is not a civilized city. In cities which have proper building laws and enforce them, such a fire with such a result would be out of the question. The Parisians of the Commune tried for a week to burn Paris, with very small success. In New York, buildings and their inmates are consumed from time to time; and New Yorkers consider it a law of nature and necessity of things that buildings should burn up, and men with them. It is safe to say that there are not a hundred buildings of the 70,000 which constitute the city of New York that would conform to the requirements of the building law of Paris. An eight-story factory without so much as a fire-proof staircase would be impossible in Paris, or in any other city with a proper building regulation. Such a law would probably be unpopular, hard to pass and harder to enforce. But it behooves the classes most interested in such a law to work in the first place for its passage, and in the second for its enforcement. Nothing is more absurd than to suppose that a man has a right in a crowded city to build as he pleases. His bad building endangers all his neighbors and may endanger the whole city, and he does not even build badly at his own risk. He continues to keep just within the verge of a law loosely drawn and loosely enforced; and he shifts his pecuniary risk upon an insurance company. Almost always the builder of man-traps gets the underwriters to assume and distribute the risk he ought to bear alone. If fire-insurance were not known there can scarcely be a doubt that sounder construction would prevail. It behooves the underwriters themselves to rectify the mischief their existence causes. They can erect for themselves a standard much higher than that of the existing law, as high as that of Paris or of Vienna, and hold their customers strictly to it. The insurance companies themselves would gain by such a course, and the owners of sound buildings would gain, since the rate now charged would be lowered if none but "good lines" of buildings were taken. Then, whatever legislation and the Department of Buildings might do or omit doing, every man would carry on reckless building-operations at his own peril, and it would not be long before New York was, as New York is not now, more secure against great conflagrations than Constantinople."

About the only new thing is the work now going on under D. and J. Jardine, architects, in converting the old Robinson Hall on Sixteenth Street, into a house for the Apprentices' Library, at a cost of $15,000; the Society of Mechanics and Tradesmen having found their old quarters at Grand Street and Broadway, rather out of the line of their patrons' travel. The library-room proper will be 34′ x 102′, and 23 feet high. This will be lined with shelving, and also have projecting series of shelves twelve feet from either side; while in height three tiers will be arranged, giving in all accommodation for a hundred thousand volumes. Light will be gained from a central sky-light measuring 8′ x 72′. Below this hall is a schoolroom, twelve feet high. The front building is four stories high; the lower portion to be used for committee-rooms, special study-rooms, and a general meeting-hall, 49′ x 18′. Exteriorly the only change will be the insertion of a marble slab bearing the arms of the society; and then the society will disgrace the front of what is now an unpretentious brick building, by clapping on showy sheet-metal lintels over each window, and a commonplace, bulky cornice. These will of course be sanded, and must be considered as stone; and if the Society of Mechanics are satisfied, they no doubt will fail to understand why a good portion of the general public, who are afflicted with notions of propriety, honesty, and truth, in buildings as in other things, should find fault with this mendacious sheet-iron stone-work.

ST. JOHN NOTES.

THAT there has been a fire in St. John, that the phœnix is engaged in his usual occupation, and that he is ably seconded in his laudable efforts by a worthy following of his coadjutors, — the members of the architectural profession, — cannot be considered news; but a few notes of what is doing, and who is there, may be interesting. St. John boasted about a half-dozen knights of the

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T-square, previous to the memorable event of last June; but more than a score are now offering their services, and still they come.

Matthew Stead was the earliest practitioner in the city, having come from the "old country" some thirty or forty years ago. He is still in practice; and the fire has spared some very good and thoughtful work of his. His son is ably following in his footsteps. Messrs. Smith and Dunn, Messrs. McKean and Fairweather, and Frank Kain, about filled the list of ante-phœnix architects, all gentlemen who had been carrying on their business in an entirely professional and fraternal way. Mr. Dunn, of Smith and Dunn, is a native of St. John, but has been engaged in Boston and in Chicago heretofore. Mr. Smith a dozen years since was a student in Mr. Preston's office in Boston, and is also a St. John man.

The extraordinary opportunity, coupled with the depression of the building interests elsewhere, has brought a score or more of architects from other cities, who have certainly filled the architectural ranks to repletion. From Montreal there are Messrs. Hopkins and Wiley, and Mr. G. F. Cole; from New York, West and Anderson, F. C. Merry, and Mr. Babcock; from Boston, Starbuck and Vinal, John Stevens, and Bryant and Black; from Halifax, Dumaresq and Dewar; also, Mr. Bowdoin from Troy, Currier and Faxon, Messrs. Croff and Camp of Saratoga, and several others whose names have escaped me. So it will be seen that the Provinces *need* not lack for professional advice. It is perhaps unnecessary to add that the now historical "master workman" of the *Quarterly Review* has many representatives who prefer their claims on the building public, and who "don't need no plans," or can very readily make their own.

Messrs. Smith and Dunn, with a view to the establishment of fraternal feeling and a uniform scale of charges, caused circulars to be issued to all the architects, inviting them to meet at their office for that purpose, on a certain evening two or three weeks since. The result was a gathering of about twenty gentlemen, who chose Mr. Wiley as chairman. A second meeting was called a week later, and attended by nearly an equal number. A committee recommended a schedule of prices, almost identical with that of the American Institute, which was unanimously adopted, as was also the scheme for the formation of a permanent organization. The only item in the schedule differing from the American Institute charges was an intermediate one of four per cent on the cost of "finished stores and office buildings;" the rate of three per cent on unfinished warehouses remaining the same — a change, by the way, which would seem a just one for the Institute to adopt at its next convention. The formation of an architectural or professional club is also on the *tapis*, which will provide rooms for social intercourse, a reading-room, etc.; a very desirable move, as places of amusement or entertainment in St. John are painfully scarce.

Several competitions have taken place, conducted in the most primitive, and, in most cases, arbitrary and unsatisfactory manner. The usual method of obtaining drawings has been simply the insertion of a notice in the daily papers, that the committee, etc., "would receive plans" up to a certain date, without the slightest intimation as to any future system of rewards and punishments. It was reported that in one case the *plans* were scarcely noticed; but the elevations were held up, one after another, and the "prettiest" won the day. On another occasion, it was said that in an important church competition, an offer of full professional services at an extremely low percentage was the silver key that placed the church treasury at the architect's disposal. It is to be hoped the proposed society of architects of St. John may prove a remedy for such irregular and discouraging conduct of competitions, and that the advice of the society to parties intending to ask competitive work, as to the proper method of obtaining the best results, may be heeded. They really have the remedy in their own hands, if they make good use of their opportunity.

The most recent competition was that for Trinity Church, for which designs were asked in the above informal way. Eleven designs were submitted, from which four were selected for a second competition; whether upon the same basis of selection and remuneration has not, I believe, been determined. Withers of New York, and Dumaresq and Dewar were two of the elect. Who were the authors of the others I did not learn.

All the building since the fire, with hardly an exception, has thus far been of the most careless and shabby description. Hundreds of wooden buildings with balloon frames and shingled roofs are sprinkled broadcast over the burnt district of 240 acres; and a worthy alderman has argued in the public prints in favor of wooden buildings, on the ground that a "brick building in burning, generates at least twenty times as much heat as a wooden one." Perhaps his constituency may have unduly influenced his judgment; nevertheless a movement has been made by the city council looking toward the framing of a building law. The act has been formulated substantially on the Boston law, and has gone to the Provincial Government at Fredericton, now in session, for enactment, with good prospects of success, Alderman Maher being spoken of as the probable inspector.

Such a law properly executed would be the salvation of new St. John, and would dispose of most of the arguments against thinness and cheapness and lightness which have to be advanced and defended by the architects (most of them) in each recurring case.

W. G. P.

THE ILLUSTRATIONS.

THE GRAND STAIRCASE OF THE NEW OPERA HOUSE AT PARIS.

M. CHARLES GARNIER, architect of the New Opera House at Paris, before his labors were completed, in apologizing for the magnificent space occupied by the grand staircase, which is nearly equal to the whole area of the audience-room, and for the monumental pomp and luxury of its decoration, which is not surpassed by any modern work, drew an imaginative picture somewhat as follows of the scenic effect which he expected ultimately to realize: "The spectators grouped at the balconies, or leaning over to view the crowded company below ascending or descending the grand staircase, will give life and animation to the architecture. These, combined with the rich colors of draperies, marbles, paintings, and flowers, and illuminated by girandoles, candelabras, and chandeliers, will form a sumptuous and brilliant composition, recalling the characteristic effects of Veronese. The dazzling lights, the splendor of the toilettes, the gay and animated figures intermingling and saluting each other in ever-changing groups, will constitute the living picture of a fête in which, without attempting to analyze the part which the architecture of the place must play in this spectacle, the enjoyment of the public will unconsciously render homage to that great art so powerful in its effects upon the mind, and so great in its results."

The steps of this staircase are in white marble of Serravezza; its balustrades are composed of balusters in red antique marble resting on a base of green marble from Sweden, and supporting a rail of onyx. On the newel posts at the foot of the ramps of the main central flight are electrotype groups by M. Carrier-Belleuse supporting bouquets of lamps. On either side descend the stairs to the vestibules below. At the head of the principal flight on the first landing, between great bronze candelabra, is a central door giving access to the lower boxes, the parquette, and orchestra; this doorway is executed in rich marbles, and decorated with two bronze caryatides (Comedy and Tragedy), with draperies of yellow and green Swedish marble in the antique Roman fashion, sustaining a pediment which is surmounted by the arms of the city of Paris, flanked by two Cupids in white marble. This is the work of M. Jules Thomas. On either side the stairs divide and ascend to the level of the first circle of boxes.

The order which surrounds the staircase hall is composed of thirty polished monolithic columns of marble from the quarries of Sarrancolin, with bases and capitals in white marble from Saint-Béat, and pilasters of peach-blossom or violet Breccio. In the spandrels above are twelve medallions of yellow marble surrounded by the heads of children and other ornaments sculptured by M. Chabaud. The entablature is decorated with marbles from the different provinces of France. Above is a flat ceiling supported by four immense coves 49 feet by 17 feet, penetrated by arcades corresponding with the order below, and adorned with paintings by M. Pils.

The intercolumniations of the order, which, on the side towards the *foyers* on the other three sides, are open through their entire height, are elsewhere occupied by balconies corresponding with the five ranges of boxes in the audience-room. Of these, the lower project upon sculptured corbels; the balusters of these lower balconies are of fluor spar with bases of various marbles, and railing of Algerian onyx. On the second and third stages these balconies are of bronze. On the upper or fifth stage above the cornice the balconies are of Campanian marble, and stone from Saint-Ylie.

Our number for Dec. 9, 1876 (p. 395), contained, it may be remembered, a general description, with a plan, of this pompous structure. With this number we present a reproduction of the drawing of the grand staircase by M. Riquois from the atlas accompanying M. Garnier's interesting work on the New Opera, the last number of which, containing this plate, we have just received.

The corridor or vestibule to the *foyer*, which is behind the spectator in this view, has its ceiling inlaid with mosaic by workmen from Venice. The *foyer* itself is a luxurious hall in white and gold, of great height and surrounded by an order of twenty columns, the entablature of which is surmounted by twenty statues representing the qualities essential to the dramatic artist. The famous paintings of M. Baudry decorate the ceiling.

DESIGN FOR A COTTAGE AT ORANGE, N.J. MR. C. C. HAIGHT, ARCHITECT.

(Trinity Building, New York, N.Y.)

STORES ON CHESTNUT STREET, PHILADELPHIA, PENN. MR. T. R. WILLIAMSON, ARCHITECT.

(506 Walnut Street, Philadelphia, Penn.)

MONT SAINT-MICHEL, FRANCE. — Mont Saint-Michel on the coast of Brittany, which enjoys the honor of never having ceased to be French, has a history of almost unrivalled interest, which is equally absorbing, whether studied from the military, the ecclesiastical, or the architectural standpoint. It is of its architectural history that M. Edouard Corroyer, a French architect, treats in an important monograph on the Abbey of Mont Saint-Michel lately published.

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PAPERS READ BEFORE THE BRITISH ASSOCIATION.

THE following are abstracts of some of the papers which were read in the different sections at the meeting of the British Association in Plymouth, which has just been concluded: —

PLYMOUTH BREAKWATER.

Mr. R. C. Townshend, on this subject, referred to the damage done to the western arm of the breakwater — the most vulnerable part of the whole structure — by a storm in January, 1867. Not only were large rough limestone blocks, varying from five to ten tons in weight, dislodged from the foreshore, but the masonry forming the granite band protecting the foot of the inner slope was upheaved and carried away for a considerable distance. The primary cause of the weakness was the subsidence of the foundation below the granite band, leaving large cavities open. It occurred to him that had the granite band been a few feet longer in the work, and the stones of greater weight, the damage done, amounting to 20,000*l.*, would not have been so excessive; and on his recommendation the Director of Works adopted a repair of a more massive character, which had realized the most sanguine anticipations. To show what heavy waves sometimes struck the work during the SSW. gale, he mentioned that eight years ago two concrete blocks weighing 24 tons each, and a limestone block 35 tons in weight, were capsized, and in one tide swept completely over the breakwater. Now, however, the whole of the structure was in excellent condition, and might not require heavy repairs for years to come.

INTERCEPTION OF RAINFALL IN SEWERS.

Mr. Baldwin Latham read a paper on this subject, remarking that the admission of large and uncertain volumes of rainfall into sewers at various periods produced considerable difficulties in many districts in which the purification of the sewage had to be effected. In the majority of towns the rainfall was admitted into the sewers, the excess of rainfall and sewage being discharged by storm-water overflows, to the great detriment of the streams which received it. The complete separation of rainfall from sewers had been advocated, but this would be attended with difficulty in crowded towns, as in times of rainfall the water flowing from the streets was found to be quite as impure as the sewage proper. The admission of rainfall into sewers necessitated an increase of capacity in the sewers, as, for example, in London two-thirds of the total capacity of the sewers was required for carrying away the moderate quantity of a quarter of an inch of rainfall in twenty-four hours. He had executed a complete system of sewerage in the borough of Longton and the contiguous district of the East Vale Local Board, the combined localities containing a population of 25,000. The Duke of Sutherland arranged to take the sewerage and use it for irrigating land. He planned a duplicate system of sewers, a connection being made between the rainfall sewers and the sewers proper. What was termed an "interceptor" was provided at the point of junction between the two systems, it consisting of a leaping weir so arranged that when there was a small quantity of water flowing down the rainfall sewers, and the liquid was as a natural consequence very polluted, it passed through the adjustable opening into the sewer proper. But in time of rainfall, when the volume and velocity of the stream in the rainfall sewers were increased, and the water was comparatively pure, it leaped over the sewer opening and passed to the natural streams of the district. He used twenty-two interceptors which cost 31*l.* each, and their employment had given perfect satisfaction to the authorities.

WATER-TANKS OF CEYLON.

Mr. B. F. Hartshorne read a paper in which he described the high civilization, together with the character and customs, of the ancient inhabitants. The paper went on to say that the great tanks remain as monuments of the enlightened despotisms of various kings, who raised the country in turn to a splendid height of prosperity. Some of them belong to periods long before the Christian era. One, called Kalawewa, was an inland sea, thirty miles in circumference, formed by damming up two rivers by means of an immense embankment twelve miles long; another, Padawiya, must have occupied a million of people for ten or fifteen years in its construction. Its *bund*, or embankment, is eleven miles in length, 70 feet high, and 160 feet thick at the base. The bed of the tank is now overgrown with a magnificent forest, and for miles around there is not a vestige of man. Its last restoration was effected by King Parakrama Bahu I.; and a stone obelisk on the spot records how he accomplished this work, "in the hope of obtaining the happiness of this as well as the next world." King Maha Sen, who reigned about 275 A. D., seems to have done most in the formation of these vast tanks. It is calculated that one which he formed, named Kanthelai, could only be constructed at the present day at a cost of upwards of one million sterling. Under the vigorous and energetic government of the Right Hon. Sir William Gregory, much has been effected in the way of the restorations of many of these tanks, and with the happiest results. The neglect and apathy of successive generations both of rulers and of the people have been the main cause of the abandonment and desolation of large tracts of land, whose fertility was formerly indicated by such names as "The Golden Plains," or "The Granary of the Kings." Foreign and internal warfare no doubt caused the destruction of some irrigation works; and their continued disrepair has been mainly owing to the disregard of ancient customs, and to the abolition of the system of compulsory labor.

EDDYSTONE LIGHT-HOUSE.

Mr. Isaac Douglass, of the Trinity House, in the course of an interesting paper on this subject, surprised his hearers by announcing that Smeaton's great work was not destined to exist much longer. Owing to very considerable tremor which occurred with each wave-stroke during heavy storms from the westward, fears have been entertained for the safety of the structure, particularly as sea water had frequently been driven through the joints of the masonry. The upper part was strengthened in 1839 and 1865 with internal wrought iron ties extending from the lantern floor downwards to the solid portion of the tower. On the last occasion he found that the chief mischief arose from the upward stroke of the sea at the cornice; but repairs were effected, and further leakage prevented. The tower was still sound, but unfortunately the gneiss rock on which the light-house was built had been seriously undermined and weakened by the sea. This appeared to be chiefly due to the incessant straining of the laminated rock by the heavy sea-strokes on the tower. It had therefore been determined to erect another light-house of larger dimensions, for which a good foundation had been discovered about 120 feet off. The elevation of the light for a range of 19 nautical miles was very desirable, so that it might be extended more toward the Channel Rock, and made to overlap the range of the neighboring Lizard lights to the westward. Unfortunately the sea rose during stormy weather considerably above the top of the lantern, thus often eclipsing the light and altering its distinctive character. This was a matter of much greater importance in the present day than it was at the date of the erection of the structure, from the enormous increase in the number of shipping, and the additional light-houses which had been established, each having a distinctive character. The power of a light in so important a position ought to be raised to the first class, but the capacity of the present tower was insufficient for this as well as for the provision of a first-class fog signal. The average annual cost of maintaining the light-house was about 585*l.* In conclusion, he could not help expressing a hope that if Smeaton's noble structure had to be taken down, as doubtless it would be after the erection of the proposed new light-house, the nation would consider it as worthy of a site on English soil as Cleopatra's Needle. — *The Architect.*

ENGINE-HOUSE OF THE PROVIDENCE WATER-WORKS.

PROVIDENCE, Sept. 5, 1877.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

THE item in the last number of your journal, in regard to the settlement of the engine and engine-house at the Pettaconset pumping station of the Providence water-works, has been floating around in the newspapers with no foundation in fact upon which to base it.

The building is built over a bed of quicksand under the central portion, and upon the solid ground at each end. In the centre of the building is a stand-pipe nearly two hundred feet high, and eight feet in diameter, with space for four enormous Cornish engines. Only one engine is at present placed in the building.

From the above statement, it will be observed that the weight is very unequally distributed, and that the greatest weight has to be carried by the most insecure portion of the foundation.

The stand-pipe and pump end of the engine, as well as the central portion of the building, rest upon a platform of hard-pine timber four feet thick; and so successfully have the engineering difficulties been met, that there is no visible evidence, such as cracks in the walls, of any unequal settlement; and I am informed that levels have been taken which show that the building stands true and level. X.

THE MASONS OF PARIS.

As is well known, the art of masonry is very ancient, but it was only in the reign of Louis IX., in the thirteenth century, that the masons in France formed an important corporation. Thanks to the perfect understanding that existed among the different members, the art of masonry made rapid progress; and in the present day it may be said that France occupies, in that respect, the first rank among all countries.

Among the masons there is the *limousin*, who works at the foundations; the *compagnon*, who does the light work; and the *aide-maçon*, who is a simple hod-man. The departments, or as we should say, the counties, which furnish the largest number of masons, are those of the Creuze and the Corrèze. No less than 60,000 workmen come each year to Paris to exercise their profession; many, after remaining during the summer in the capital, return home for the three winter months. These emigrations are chiefly caused by the sterile and unproductive nature of the soil of the country. As for the slaters, their origin is much more modern. We learn that King Dagobert covered the cathedral of

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St. Denis with sheets of lead, but this was an unusual occurrence; tiles and slates have been introduced comparatively recently.

In Paris, the home of the masons is the Rue de l'Hôtel de Ville, formerly known as the Rue de la Mortellerie in consequence of the ravages which the cholera produced there in 1832. This street offers to the lovers of the picturesque the most strange aspect; from end to end the Rue de l'Hôtel de Ville is peopled by workmen known under the various names of *limousins*, masons, stone-cutters, and dressers; they are true workmen, who think only of their work, without caring about the *chefs-d'œuvre* in the building of which they play so important a part. They leave their villages to work in the great city, under directions; and when the task is completed, they return home, little thinking of what they have built. To such a pitch is this indifference to all else carried, that often in their old age they express a hope that they may not die before having seen Paris.

These masons, almost all coming from the same part of the country, seek to keep together. The lodgings inhabited by these workmen are formed of rooms in which sleep together *coteries* (according to the technical expression used by them), composed of six, eight, twelve, or even twenty-five workmen. Each *coterie* comes from the same village. They leave home for work at five in the morning, each bearing with him a large hunk of coarse bread, in the middle of which has been inserted a red herring or a piece of *merluche*, or salt cod. This meal, washed down by a glass of water, and taken while at work, at an hour usually marked by several laths struck together, serves till the evening, when the gang returns home at about seven, and finds laid on a long table knives and forks equivalent to the number of lodgers. Soon a large bowl is brought to each, filled to the edge with a thick fat soup, exhaling a really appetizing odor, and in the middle of which is a slice of beef surmounted by a large carrot. Each lodger takes his place, and in a short time the whole is consumed, the general harmony only from time to time disturbed when some one of the party is noticed to have a larger carrot than his neighbor; immediately a shower of witty and stinging remarks are launched, in which the names of the lucky lodger and the cook are mingled intimately.

After the meal, the workmen, who are as a rule excessively sober, go and pass on the neighboring quay the hour or so which separates them from the time of retiring to rest. They may then be seen sitting on the parapet, silent, and not smoking, which may appear strange, but which is in reality true. This family of workmen is as honest in its outward form as it is upright in conduct, and it is very rare that a passer-by has ever had to complain of any insult or inconvenience.

Let it be remarked that after the evening meal, as after the morning repast, the mason only drinks a glass of water. He has then spent in his day eighty centimes (about 7½*d.*) for his food, and forty centimes for his bed; in all, one franc, twenty centimes (not a shilling); and as he gains five francs, fifty centimes, — that is, something more than 4*s.*, — he realizes each day an important economy. Let it be remarked, however, that the mason does not dress himself; he only lives in the city during the fine weather, and simply needs for his work a blouse, a pair of corduroy trousers, and a large felt hat, which he brings from his home, but which is rarely worn.

The rooms of which we have spoken are almost all uniform; the beds are composed of a hard mattress and sheets of coarse linen, but always clean and well kept. A square box in which the workman keeps his tools, his trowel, his square, his plumb, and sometimes also his letters from home, is placed under the bed. Let it not be imagined that the dust that covers it is the dust of oblivion: respect it, it is the dust of the owner's profession.

The old workmen are generally married in the country, where the wife, who tills the piece of land, increasing in size each year, brings up her children in the paths of honesty and labor, and thus forms the masons of the future. On returning to Paris, like the swallows, with the fine weather, the mason transports his habits, which he preserves pure and unsullied from alloy with the civilization of the capital. He puts by, and of the pay each fortnight he spends alone what is necessary; but it is not the box which will receive his economies: the money will be placed by the side of the trowel which gained it, in the hands of the *dean* of the room, often a municipal councillor in the village, and who thus preserves amidst his brethren a real authority.

At the end of the campaign, that is to say, five months later, each one makes up his bundle to return home; and then each mason may be seen with a knapsack on his back, a large pair of shoes outside, and in his hand a huge red umbrella. On the arrival near home, the caravan separates; each rejoins his family, and hangs up his umbrella as a trophy and a recollection. As for the money so painfully gained, it is consecrated to the acquisition of a piece of land, the dearest investment which the Frenchman can make. On the Sunday the mason dons his suitable costume, and, having attended mass, wanders by the river; rarely, if ever, giving himself up to any costly pleasure.

Such is the life of the Parisian mason. How different to that of the London workman, and how little the two have in common, with the exception of hard work! — *The Builder.*

DRYING PLASTERING IN DENMARK.

ACCORDING to the *Grossherzoglich Hessisches Gewerbeblatt*, a Danish architect, Mr. Kruse of Copenhagen, has recently erected a building, and prepared it for occupancy, in forty days; the walls being dried in three days. A calculation showed that from each story there was a minimum of four thousand gallons of water to be evaporated. To do this, a great increase of temperature was necessary, and coke-stoves were placed in the cellar at the base of every chimney. One flue, probably, served for all stories. The chimneys were then closed above the roof, and a passage allowed the dense smoke by cutting openings into the flues six inches underneath the ceiling of the first story. An escape was then allowed on the level of the floor; and the rooms thus filled with currents of smoke and gases were quickly dried. This process was repeated floor by floor, the openings being successively broken out and walled up. The temperature varied from ninety-five to one hundred and twenty degrees Fahrenheit, and was, of course, lowest at the floor-level. The ventilation was so great, that the air, or rather the smoke, in the rooms, was totally changed from five to six times an hour. Something less than nineteen tons of coke were needed for a story, though we are not informed for how many rooms. A single workman was alone employed to attend the firing. It is also stated that the wood-work remained unharmed, there being no shrinkage noticeable in the doors, windows, etc. When dry, it appeared that the wall-plaster had attained an exceptional hardness, owing, no doubt, to the great quantity of carbonic-acid gas, produced by the imperfect combustion, which had changed the caustic lime into carbonate of lime. So says the report. It is quite customary to burn charcoal in newly-plastered houses for the sake of the gas; but there are few attempts of so great a magnitude as this on record. It seems strange that three days of such heat, and the evaporation of such quantities of water, should not have caused the wood-work to shrink or check, as it might reasonably have been expected to crack the walls. Plaster thus rapidly dried, and capable of absorbing little or no water, must have increased the labor of the kalsominer, paper-hanger, or frescoer: the carbonic-acid gas which filled the house naturally rendered superintendence impossible; and it is to be supposed that walls, ceilings, and floors were blackened by the smoke. But these are minor considerations: the great objection is, that the plaster was probably only hardened on the surface. It is a well-known fact that mortar in any form does not reach its usual firmness when dried in the heat of summer even. It seems as though the presence of water were necessary to aid the combination of lime and carbon. One of the best authorities on the subject, Vicat (*Recherches sur la Chaux*) goes so far as to assert that mortars lose four-fifths of their strength if dried too rapidly. He commends the custom of the masons of Northern Italy, who, in constructions of importance, water the masonry during the summer months to guard against this danger. It is an old saying, that lime at a hundred years is but a child; and such precocious forcing at birth does not appear conducive to long life.

NOTES AND CLIPPINGS.

AQUARIUM AT CINCINNATI. — Mr. James W. McLaughlin has prepared plans for the new aquarium. It is to be a stone building T-shaped in plan, the body measuring 48′ x 136′ and the head 48′ x 96′. The aquarium will be in the basement, and will measure 60′ x 150′ with a hallway for visitors, 24′ wide. Along the sides will be the fish tanks, sixteen large ones and about a dozen small ones, together with a seal pond and fountain. The visitors' hall will be kept dark. Light will be admitted from above at an angle of 60′, at the outer sides of the tanks, so as to place the fish between spectators and the light. This is an idea carried out with great success in Germany. Artificial salt water from a tried recipe will be prepared, better, it is said, for the purpose than natural sea-water. It is free from all dead animal substances, injurious to the health and life of fishes, as is shown in the shipment of them in tanks filled with it. The artificial water is in successful use at the Berlin Aquarium. It is proposed to aërate it, either by constantly pumping in air through small pipes, or by drawing it off into a large tank, pumping it back again, and keeping it constantly flowing through the series of fish-tanks. On the ground floor will be, in front, a restaurant (48′ x 96′), back of it a music-stand, and back of that a winter garden or palm-house (48′ x 108′) similar to one in Frankfort-on-the-Main. At the other end of the hall will be three aviaries at the sides, and a row of reptile cages around an opening above the seal pond. On the second floor will be a ball-room, 48′ x 96′, and adjoining it a promenade, looking down upon the winter garden.

THE INTER-OCEANIC CANAL. — The scheme of M. de Puydt, which has been adopted by a society styling itself the "*Société Internationale du Canal Colombien*," looks to a canal without lock or tunnel. On the Atlantic side, the canal would begin at Puerto Escondido, one hundred and forty miles south-east of Panama. The highest level to be passed is only forty-six mètres above the level of the sea. The canal, which would itself be about fifty-four miles long, would eventually join the River Tuyra, about forty miles from its mouth. The striking peculiarity of the scheme is the absence of locks, though the canal itself would not have the same level as the ocean, but would have a reservoir somewhere on the River Pucro, where the water from the higher regions would be collected and flow down gentle slopes on either side to the Atlantic and Pacific Oceans!

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FIRES IN CHICAGO. — The following is the summary of fires for the month of August: alarms, 41; "stills," 8. Class of buildings: frame, 26; brick, 7. Occupation: dwellings, 14; barns, 8; saloons, 4; coal and wood-sheds, 2; vacant buildings, 3; and one each, hotel, grocery, ironworkers, woodworkers, church, dry-kiln, meat-market, tenement, roofing-shop, railroad-car, boarding-house, drug-store, and albumen-factory. Origin: due to mischievousness, 4; maliciousness, 5; defective flues and chimneys, 5; kerosene-lamp, 5; spark falling on shingle roof, 2; spark from locomotive blown into bedroom-window, 1; smoking, 4; gross carelessness, 4; boiling chemicals, 1; lightning, 1; hot ashes, 1; shavings stored in closet for kindling, 3; overheated cookstove, 1; tar-kettle, 1; constable's custodian, 1; incendiary, 5; and false alarms, 8. Total, 52. Loss, $17,800; loss covered by insurance, $12,050; total insurance involved, $85,000.

FIRES IN NEW YORK. — The monthly report of Fire Marshal Sheldon shows that during the month of August there were 100 fires, involving a total estimated loss of $17,135, of which $5,030 was on buildings, $12,105 on stock; $1,700 uninsured loss on buildings and contents. During the month of August, 1876, there were 89 fires, resulting in a loss of $363,405, the average loss per fire being $4,083.

THE LATE EMIGRATION OF MECHANICS. — The St. Louis *Republican* states that Mr. Newton Crane, U. S. consul at Manchester, England, has notified the Treasury Department that the men who have arrived from America have been grievously deceived, and can neither get the wages they expected nor find work at lower wages.

TRUSS BRIDGE. — The channel-span of the bridge over the Ohio River at Cincinnati, built by the Keystone Bridge Company of Pittsburg, for the Cincinnati Southern Railway Company, has just been swung clear of the false works. This is said to be the largest span (520 feet) of truss-bridge in the world. The upper chord is 185 feet above ordinary water, and weighs about 1,300 tons.

FROM NEW ORLEANS TO THE SEA. — It is proposed to dig a ship canal between New Orleans and Barataria Bay, — an estuary of the sea that penetrates far into the land on the south coast of Louisiana. The distance from New Orleans to the Gulf of Mexico by this route would be only fifty-eight miles. The cost of digging the canal, it is estimated, would be $5,000,000. Neither Congressional nor State aid is asked: the advocates of the canal solely ask Congress to grant them the right to use the tidal waters of Barataria Bay.

BUILDING ASSOCIATIONS IN TENNESSEE. — Two and a half million dollars, it is said, have been expended in building operations in Memphis, Tenn., in the past two years. Building associations afforded much assistance, two hundred buildings having been erected by loans from them, at an average cost of $2,156 per house.

THE FRENCH EXHIBITION. — Work upon the main buildings has reached such a stage, that on the 10th inst. foreign architects and builders were admitted to begin upon the buildings for their respective countries.

THE FALL OF A MOUNTAIN IN SAVOY. — An interesting account of the recent falling of a mountain in Tarentaise, Savoy, causing disaster to two flourishing villages, has been communicated to the *Courrier des Alpes*, by M. Bérard. The phenomenon has been incorrectly reported as instantaneous and the destructive effect complete, whereas the case is that of a mountain which for twenty days, without cessation, has been dismembering itself and literally falling, night and day, into the valley below, filling it with piled-up blocks of stone, extinguishing all sounds by its incessant thunder, and covering the distant horizon with a thick cloud of yellowish dust. The entire mass comprised in the slope forms a mutilated cone 200 mètres broad at the top, and 600 at the base (the slope being about 50 degrees); this is composed of hard schist lying close together, but no longer united; and it is united to the body of the mountain only by a vertical mass of 40 or 50 mètres thick, which is already fissured and shaken. Periods of repose occur, lasting only a few seconds, or a minute at most; then the movement recommences and continues about 500 hours. Blocks of 40 cubic mètres become displaced with no apparent cause, traverse the 1,800 mètres of descent in thirty seconds, leaping 400 or 500 mètres at a time, and finally get dashed to pieces in the bed of the torrent, or launch their shattered fragments into the opposite forest, mowing down gigantic pines as if they were so many thistles. One such block was seen to strike a fine fir-tree before reaching the bridge between the villages; the tree was not simply broken or overthrown, but was crushed to dust (*volatilisé*); trunk and branches disappeared in the air like a burning match. Rocks are hurled together and broken into fragments that are thrown across the valley like swallows in a whirlwind; then follow showers of smaller fragments, and one hears the whistling sound of thousands of pebbles as they pass. M. Bérard reached the edge of the rock (2,460 mètres high) on one of the sides of the falling cone, and ventured along it, obtaining a good view of the "terrifying" spectacle. He re-affirms his conviction that the phenomenon is inexplicable by any of the usual reasons that account for Alpine disturbances, such as penetration of water or melting of snows, or inferior strata in motion; nor does the declivity of the slope explain it. His hypothesis is that some geological force is at work, of which the complex resultant acts obliquely to the axis of the mountain, and almost parallel to its sides. — *Nature.*

APPROXIMATE DATA CONCERNING WATER. — At 62°, the standard temperature of water, a gallon of water weighs about 62 lbs., and can be contained in a measure one foot square, and nearly two inches deep, or one whose diameter is one foot, and whose depth is about 2½ inches. A given volume of water in cubic inches may be converted into gallons by multiplying by .00036. A ton of water contains 224 gallons, or 35.9 cubic feet.

THE FARNESINA PALACE AT ROME. — A correspondent of The *Pall Mall Gazette* states that the Farnesina Palace, so well known to all visitors to Rome for the story of Cupid and Psyche as told in fresco by Raphael and his disciples, is in great danger of collapse, owing to the works going on for the improvement of the channel of the Tiber. The commission appointed immediately after the great flood of 1870 to devise means of preventing the recurrence of similar disasters has suggested the widening of the bed of the river by cutting off corners wherever practicable, and giving the stream a freer course. The Farnesina garden, as forming a curve in the river, besides being open ground, was pitched upon at once to be removed. The Duke of Ripalta, to whom the property belongs, applied to the Academy of St. Luke, the great authority on all art questions. The gist of the report agreed to by the Academy is that after careful examination of the palace walls and the soil on which they stand, the deputation believe that the digging of foundations for the river-wall will, by producing strong under-currents, cause the water to wash under, or at least filter through to the foundations of the palace, and that the walls would then sink or crack and the fresco drop off; that, unless the greatest care and attention are bestowed on the work, the paintings will be not only damaged, but irretrievably ruined, and that such care is not now taken.

EXHIBITIONS. — The first exhibition of apparatus for heating and ventilating recently held in Cassel, at which almost every civilized nation was represented, has proved a decided success. During this month a large collection of objects of modern ecclesiastical art will be exhibited in Würzburg. It will embrace architectural designs and models, works of painting and sculpture, the creations of the organ-builder, bell-caster, cabinet-maker, embroiderer, etc., so far as they serve the interests of the church.

THE LEVEL OF THE MEDITERRANEAN. — The engineers of Marseilles have, it is said, discovered that since the opening of the Suez Canal, the level of the Medeterranean has sunk three and one-quarter inches.

ENDOSMOSIS IN BUILDING. — Experiments by Profs. Märker and Schultze show that air and gases pass through the walls of buildings with wonderful facility. All that is necessary to promote the passage is a difference of temperature of ten degrees between the inside and outside air. The figures given are as follows, per hour, for each square yard of wall surface: through sandstone, 4.7 cubic feet; through quarried limestone, 6.5; through brick, 7.9; through turfy limestone, 10.1. This fact of the penetration and flow of gases through stone has an important bearing on the construction of wholesome residences. Most people are under the impression that if a cellar is lined with Portland cement, the dampness and malaria of the earth beneath will be shut off. If not in some way prevented, earth vapors pass upward into the building; and that part of the process is usually hastened in the winter months by a furnace in the cellar. Doubtless many malarial diseases, such as typhoid fever and diphtheria, may thus be propagated in cities, especially where the building sites are imperfectly drained, or are "made ground." The experiments referred to are an additional proof that a Portland cement lining will not cut off the malarious gases, as indeed might also be inferred from its porous character. The only effective barrier against foul air and dampness must be some substance which is not permeable. Probably this result might be attained by means of a layer of asphalt or bitumen, if it were evenly spread, and weighted so as to keep in place. In view of the estimate that half the diseases of mankind are preventible, it is not too much to hope that modern sanitary improvements may largely reduce the death-rate in cities. With many residences the improvement needs to begin at the bottom.

THE RAIN-TREE. — The Consul of the United States of Columbia in the Department of Loreto (Peru) has written from Yurimaguas to President Prado, informing him that in the woods adjacent to the city of Moyobamba exists a tree called by the natives Tamia-caspi (rain-tree), which possesses some remarkable qualities. It is a tree of about 15 mètres (about 50 feet) high when at maturity, and of about one mètre in diameter at the base, and has the property of absorbing an immense quantity of humidity from the atmosphere, which it concentrates, and subsequently pours forth from its leaves and branches in a shower, and in such abundance that in many cases the ground in its neighborhood is converted into a perfect bog. It possesses this curious property in its greatest degree in the summer, precisely when the rivers are at their lowest and water most scarce; and the writer proposes that it should be planted in the more arid regions of Peru, for the benefit of agriculturists.

HYDRAULIC CEMENTS. — A bed of fine hydraulic clay, similar to the beds found near the Thames, England, has been discovered near Austin, Texas. It is proposed to work it for the purpose of making cement.

EXCAVATIONS IN A ROMAN CAMP. — *Galignani's Messenger* of July 25 says: "Some excavations for antiquarian purposes are at present being made in the old Roman camp of Marlès, near Lançon (Bouches-du-Rhone), which contains some cisterns closed from time immemorial. Already a fine marble statue of Jupiter and an iron lamp with four sockets have been discovered. The intrenchments cover a space enclosed by lines of about 3,500 mètres in length, flanked by towers at ten paces apart. The walls are in ruins, and have been cut down to the level of the soil within the enclosure, but on the outside they are six mètres high, and follow the crest of the hill."

MICA. — A large order has been received for plates of mica to go to China. The Chinese use these plates, which are about seven inches square, for idolatrous purposes. They paint upon them the likenesses of their divinities, and reverently adore them. These particular ones are to be used for household decoration and devotion.

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CHARLES GARNIER ARCHT.

GRAND STAIRCASE OF THE NEW OPERA-HOUSE, PARIS.

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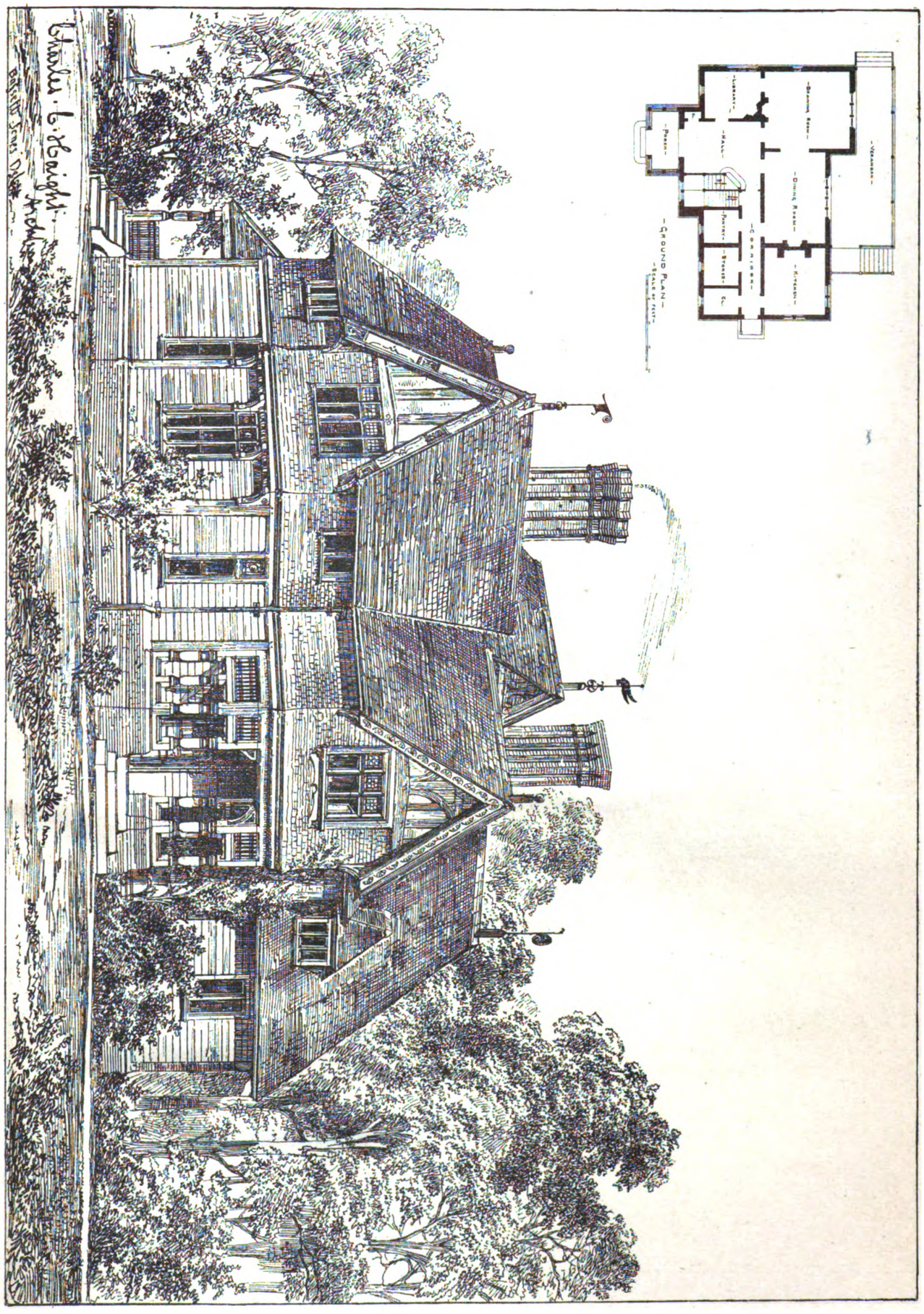

DESIGN FOR A COTTAGE AT ORANGE, N.J.

— MESSRS. C. L. HAIGHT, ARCH'TS. —

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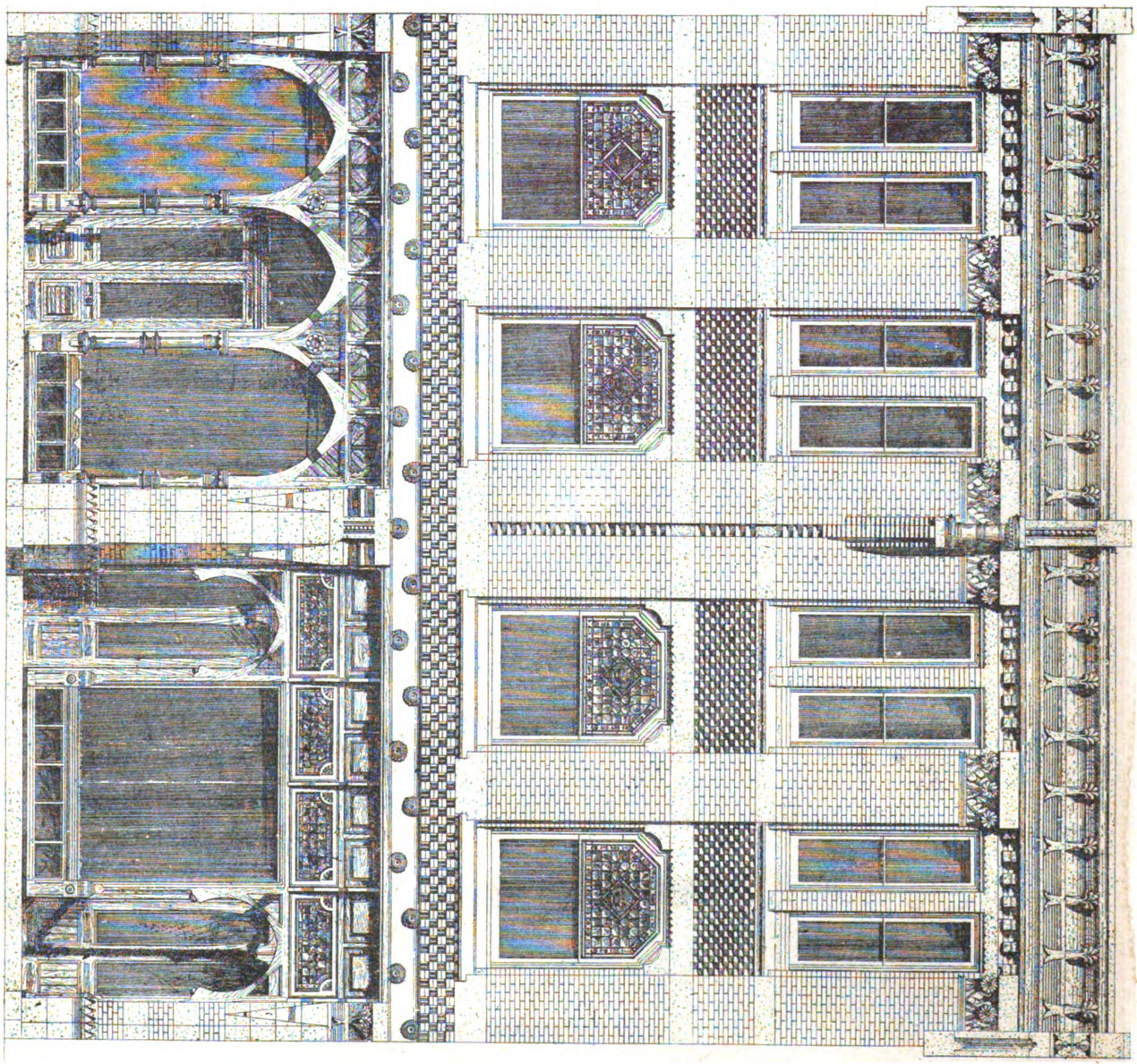
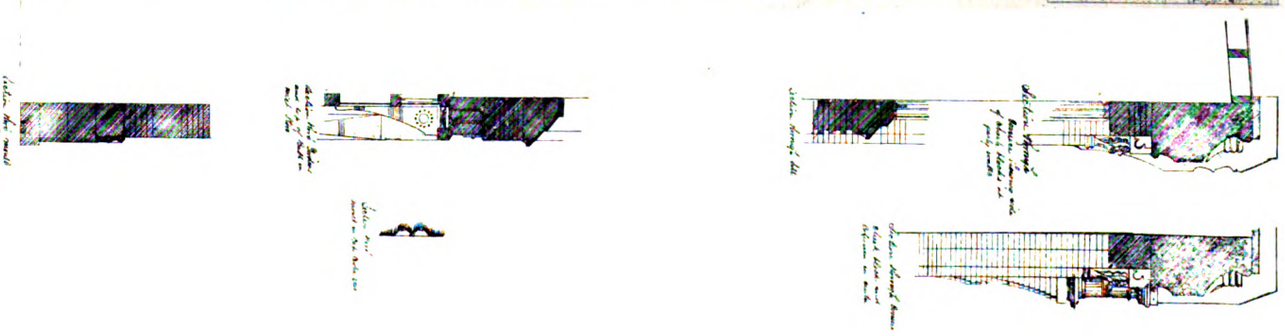
STORES ON CHESTNUT ST. PHILADELPHIA.

MR. T. R. WILLIAMSON ARCH.T.





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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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IN innumerable towns and cities throughout the country the feeling of gratitude towards the soldiers and sailors by whom during the war of the Rebellion the Union was re-established and slavery abolished, has naturally taken form in memorial structures of various device, among which that dedicated on Monday last, on Boston Common, is doubtless one of the most conspicuous. In our leading article of Aug. 18 we made some remarks concerning monuments in general and the peculiar difficulties surrounding the designing of them; but the sentiment which has prompted the erection of our monuments of the war is of such a nature that criticism in regard to their artistic merits or demerits is, to a certain extent, disarmed. We too would hesitate to "peep and botanize upon our mother's grave;" but as these structures are monuments not only of our piety and patriotism, but of our national attainments in the highest department of art, it seems not unbecoming for a journal of this character to take advantage of the opportunity offered in the completion of the Boston Memorial, to say a few serious words as to the results of all these efforts to express by form sentiments so noble and tender. The opportunity has been great; how has it been used? To say that, in the great majority of cases, the expression has been unworthy of the thought, is simply to admit that we are not as yet an artistic people, that the resources of art are not yet at our command, or if at our command, that they have not been appreciated and used. Our errors, whatever they are, may be attributed to ignorance and not to indifference; and that our ignorance is due not to any natural incapacity of perception is apparent from the fact that the poverty or baldness of design in these memorials is exhibited, not so much in bad sculpture, — for some of it is excellent, — as in its unskilful union with crude architectural forms. A mass of costly stonework, carefully cut, put together with the best mechanical skill and precision, set up in a public place, having no practical use whatsoever except the ostentatious performance of its constructive duty to uphold a statue or to contain an inscription, or to convey a concrete sentiment to the mind by means of military, naval, or civic devices, must have a separate and essential beauty of its own; a beauty of fitness, obtained by extreme refinement of proportion, choice of detail, propriety of outline, so carefully considered and chastened that it must feel the variation of the fraction of an inch in any of its dimensions. Until by study it has been exalted to this condition of sensitiveness, it has no right to exist as a monument or as a part of a monument; it is not a work of art, it is a work of stone-cutting; and to lavish upon such a block a profusion of emblems, or to surround it with statues, will not raise it in the scale of art. It need scarcely be said that few, if any, of our monuments will bear this test. We can diminish the width or increase the height of any of their parts without loss or gain of effect. They have not been vitalized by the study of a practised artist; they are crude in expression; and if the author has ventured with his blocks to repeat the language of a style, in nine cases out of ten we find the style has been misunderstood and misused.

THE Boston monument to her soldiers and sailors offers itself to us as one of the best of its kind. As a work of architecture as well as of sculpture, it is attributed to Mr. Martin Milmore, a sculptor whom we recognize as an artist of unusual merit. The elements of his composition are simple enough: a colossal figure upon a Doric column supported by a pedestal with a cornice, a panelled die, and a plinth; under this a comparatively low sub-base or plinth, with projecting blocks at the four angles, each bearing a typical figure, and the whole united with the ground by three steps. This architectural composition is not offensive, its proportions are according to the books; one cannot object to its simple mouldings; but it sins in this respect, — it is *commonplace*. Considering the function of this piece of architecture, this is the unpardonable sin; there is no attempt made to adapt the order to this especial use, no touch of grace or poetic feeling, none of that invention and courage which compel the formality of the order to yield its cold virtue of correctness. The division of the shaft by sculptured bands into four equal or apparently equal parts, the arbitrary selection of one of these parts for the enrichment of fluting, the interruption of the base of the column by four blocks supporting figures in high relief against the lower drum of the shaft, — these expedients are bold indeed, but they are crude and (to speak after the manner of architects) illiterate. No architecture can submit to equal divisions in height without becoming mechanical; and the four blocks at the base of the shaft render necessary a bold variation from the usual base of the column in this order; but the variation attempted in the use of the Attic base is insufficient and timid. The four figures planted on the angle buttresses of the plinth are very unhappily placed. From diagonal points of view three of those statues are presented; the two outer so detached by wide intervals from the monument as to destroy the unity of the composition, the middle one so set against a sharp angle as a background that all its lines suffer from the harsh contrast of light and shade against which it is projected. From every accidental point of sight the monument *sprawls* at its base. It is neither compact nor pyramidal in effect. It is perhaps in the placing of the statues that this composition seems most to need the study of the architect. These figures are too good in modelling to be so inartistically disposed. They are simply sacrificed. It is also a matter of regret that the original intention of the design was altered in respect to the material of the statues. These are of bronze, and the two materials, bronze and granite, cannot be combined with success. They are essentially antagonistic in color, and an effect of unity cannot be obtained with any such combination unless one or the other material is much more subordinated than in this composition. Among the minor sins of commission in this design, we may mention the eagles above the abacus of the shaft; they are weak and misplaced. We shall doubtless be referred to the monumental columns of Rome as prototypes of this in respect to many of the points which we have noted, but the comparison cannot be maintained for a moment. They are the works of masters in architecture: this is the work of an amateur.

WE have discussed this design purely as a work of architecture, and we hope with all the respect and moderation which such a subject demands. If we find the monument itself indicative of a prevailing want of sensitiveness as regards matters of art, the silence of criticism would be a still more evident proof. We present herewith a sketch of the Boston monument, and, for the sake of such instruction and interest as may be afforded by the comparison, reproductions of several monumental studies published by the "Intime Club," a society of students of architecture in the *École des Beaux-Arts*, at Paris. As the work of students as well as of masters, they give a fair picture of what is done in an atmosphere of art even by unpractised hands. The freedom and poetic character of these designs is based of course upon an absolute knowledge of the orders, which are the grammar of architecture. Their failures are in the direction of assurance, and superabundance of strength. Our failures in works of a similar character are attributable, not to timidity indeed, but to a want of training in the "low beginnings" of archi-

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tecture. Until our students shall have had the opportunity to make the public familiar with good things, the public will remain content with poor ones.

THE dedication of the Soldiers' Monument in Boston, on the 17th inst., was marked by one unhappy accident. There were several stagings erected by the city, on the route of the procession, for the accommodation of spectators; also one around the monument itself. These structures were examined by order of the Inspector of Buildings; and we learn that the staging around the monument, which was visited by the inspector himself, was strengthened on his requisition. Those erected on Blackstone Square however, which were visited by his subordinates, proved insufficient through want of longitudinal bracing, and one of them fell in the direction of its length, carrying with it a crowd of occupants, many of whom were seriously injured. Until the report of the official inquiry is received, it is proper to withhold an expression of opinion as to the responsibility of the accident. But wherever the blame is to rest, the criminal carelessness of the structure cannot be doubted; and if the inspectors permitted the occupation of such a structure after examining it, they should find it hard to escape the consequences of their oversight. This is to be added to that accumulating list of experiences by which the lesson is enforced that the price of security is unceasing vigilance. We have had occasion of late to approve the record of the chief inspector, and sincerely trust that in this matter his action may be found consistent with our statements.

ACCORDING to the evidence before the coroner's jury in the case of the deaths occasioned by the burning of J. P. Hale's piano-forte factory on West Thirty-fifth Street, New York City, Sept. 3, the building had walls 20 inches thick to the second story, 16 inches thick to the third story, and above that 12 inches; but the new portion had its walls 24 inches thick to the second story, 20 inches thick to the fifth story, and 16 inches to the top. The authorities of the Department of Buildings testified that the structure was in accordance with law; evidence was also given that in the depth of 200 feet there were two staircases extending the whole height of the building, and two chain or ladder fire escapes outside on each side of the building; that on the fifth floor there were several hogsheads of water, and pails of water were placed in several stories for the extinguishing of fires. The verdict of the inquest, however, includes a censure of the owner of the building, on account of his neglect to provide adequate means for the extinguishing of fires, and recommends that the proper authorities compel the owners of such buildings to provide in each case a tank or tanks filled with water and placed at the top of the building, with standing pipes from the same with a hose attached on each floor; and that all drying-rooms be built strictly fire-proof; and that the commissioners of public works cause larger mains to be provided in such localities. The destruction of this factory, furnished, as it appears to have been, with all the appliances for safety required by law, if the opportunity is properly used, cannot fail to mark another step towards a more civilized method of building. "Out of this nettle danger, we pluck this flower safety."

FIRE MARSHAL SHELDON'S recommendation that all factories should be supplied with water-tanks having proper standing pipes and hose connection, is admirable; but the recommendation should be accompanied by some provision of the law contrived to compel occupants of such structures to have a periodical fire-drill of their workmen in connection with these appliances. Without some such drill the most admirable contrivances become inoperative in the moment of danger. The importance of the proposition made by the superintendent of buildings to require all drying-rooms to be made fire-proof is so self-evident, that the necessity of making the proposition accuses the present building laws of the city of New York of a very culpable omission in this respect. A proper step towards the necessary amendments to the law was proposed on the 13th inst. in the Board of Aldermen by Mr. Alderman Morris, who offered a resolution for the appointment of a board of ten experts composed of three carpenters, three masons, two iron-builders, one civil engineer, and one architect, who shall make a general review of the law, especially guided by the experience gained in this latest disaster, shall examine the present administrators of the law to ascertain if they are competent, and shall advise with the Corporation Counsel in the preparation of an amended law to be sent to the next legislature for enactment. Now is the opportunity for the New York Chapter of the American Institute of Architects once more to make its influence felt, and in this movement to contribute its due share of intelligence and experience, which, by the by, seem to be rather insufficiently recognized in the resolution mentioned above. There should be no rest so long as the iron is hot.

AT the Annual Convention of the American Institute of Architects to be held in Boston next month, there are to be two stated subjects of discussion, the one on Religious Architecture, having especial regard to the proper effect of modern necessities and requirements on consecrated forms, and the other on Fire-Proof Building, including mainly a consideration of the methods by which floors and roofs may be rendered uninflammable. If the best experience of members of the Institute is brought to bear upon these discussions, they cannot fail to be in the highest degree instructive and useful. The opportunities offered by such occasions as that of the Convention of the Social Science Association at Saratoga on the 6th and 7th inst., and as will be presented at the Annual Convention of the architects in Boston next month, are a necessary part of the machinery of progress. They enable us to make the best use of experience, to compare notes with those engaged in studies similar to our own, and encourage and renew us for fresh efforts. As regards the former Convention, we shall be able in our next issues to print one or more papers on architectural subjects there presented, together, we hope, with a general statement of the discussions on sanitary building.

OUR English professional exchanges bear the usual marks of the annual metropolitan dulness occasioned by the season. The *Builder* has an excellent leader on the genius of Rubens, recalled by the late fête at Antwerp in his honor; and a report on the progress of the German restoration of Strasburg Cathedral, which includes the placing of fourteen new colossal statues of emperors and kings on the exterior, most of them equestrian. The article of principal interest in the *Architect* is a report of the examination of Sir Gilbert Scott by a parliamentary committee, with regard to the style and alleged deficiencies of the Foreign, Home, and Colonial Offices erected from his designs at Westminster. In this examination, the distinguished architect attempts to show the sacrifices of accommodation which he was compelled to make when directed by Lord Palmerston to change the style of these buildings from Gothic to Renaissance. He compares the cost and convenience of these buildings with those of the banqueting hall of Inigo Jones, and the Somerset House of Sir William Chambers; and explains how Gothic work admits of a larger window area than Renaissance. His views were elicited under a sharp fire of questions by such men as Mr. Beresford Hope, Sir George Bowyer, Sir William Fraser, and others; and the whole presents, in very entertaining contrast, the views of intelligent laymen and of a distinguished architect upon questions of style and its relations to the economy of building. The *Building News* gives several interesting plates of drawings illustrating Ford's Hospital, a famous timber building erected in Coventry in 1529. The window tracery is of thin wood perforated, and the glazing behind is square. The timber-framing is only four inches thick, filled in solid with plaster finished flush on both sides. The whole of the external timber-work is coated every two or three years with boiled oil. The details and profiles of the mouldings are unusual and very good. This building might furnish many curious *motifs* for our own wooden architecture.

THE State Department has preserved such information relative to the old bench-mark of Jefferson's Meridian stone, which was removed by Gen. Babcock under the Board of Public Works, that it will now be possible for the engineers to fix the actual amount of settlement of the Washington Monument.

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THE DOME OF ST. PETER'S.

THE fear of insecurity which has always waited on the dome of St. Peter's has recently become once more a serious matter. Most persons remember what dangers menaced it from its infancy in spite of Michael Angelo's care for its stability, as well as the precautions which were taken to secure it, and which have thus far sustained it. The iron girdle which was added to the armatures that Michael Angelo had provided, and which checked the first spreading of the dome, has not been enough to secure the structure altogether from further injury. The cupola has been carefully watched, and indications of further settlement and dislocation noted, which of late have become serious enough to excite anxiety.

Settlement and cracking of the masonry, accelerated by the introduction of openings which were not intended by Michael Angelo, have continued, and have been aggravated to a dangerous degree, it is said, since the bombardment by the French in 1849. The threatening condition of the dome has roused the interest of the Russian Academy of Fine Arts; and not long ago, at its solicitation, the Russian government sent a commission, which, by the favor of the authorities at Rome, has made a thorough examination of the deterioration. In a recent number of our Russian contemporary, the *Zodtchy*, we find a very interesting account of the examination from the chief of the commission, whose name unfortunately is omitted from the paper. The report is too interesting not to be laid before our readers; but in order to make it more intelligible, it will be worth while to defer the account of the present condition of the cupola till we have recalled the chief points in its construction. The great cupola consists, as is usual, of four parts, — the ring which rests on the foundations forming the base of the structure, and is treated on the exterior as a stylobate; the drum or tambour pierced by sixteen large windows, with columnar buttresses between; the dome itself with its supporting attic; and the lantern. The ring, measured from the soffit of the great arches at the crown, is about forty-three feet high by thirty feet thick, and is pierced by an annular vaulted corridor six feet wide, which, making the circuit of the cupola, is lighted by four small windows, within and without, at the cardinal points of the church. In every fourth buttress a spiral stair leads up from this corridor to the space between the two shells of the vault. The drum, to which is applied the principal order (Corinthian) on the outside and inside, is fifteen mètres high (say forty-nine feet) to the top of the order. Its wall, of about ten feet thick, is re-enforced by the buttresses between the windows to the full thickness of the ring below. The buttresses consist of a return wall, set against the middle of each pier, flanked by two columns which are attached to its exterior angles, the entablature of the order being broken around the whole. Arched openings in the wall of every buttress give a passage round the drum on the cap of the stylobate. The attic, which surmounts the order of the drum and carries the dome, is about eighteen feet high and is solid. The form of the lantern is familiar, and there is nothing specially remarkable in its structure. The small dome with which it is covered, which does not show from without, is levelled up in the haunches to a flat floor, and on this rests the hollow conoid of masonry that supports the ball and the cross. The whole is stayed to the dome with iron rods.

The construction of the great dome is unique. It consists of two shells of masonry, of which the inner is the thicker, the outer one being covered with lead. They unite for some thirty feet above the attic in a solid zone, above which they gradually separate, the outer shell having a steeper rise than the inner, till they are about ten feet apart. The outer curve of the dome, which is very noble, is found not to coincide with any of the curves of the second order, and it is thought that it must have been described by hand. M. Garnier, by the way, in his article in the *Gazette des Beaux-Arts* of last year, in which he attracted so much attention by attacking the fame of Michael Angelo as an architect, asserted that this curve, supplied by another hand than Michael Angelo's, was the only fine thing in the dome, and drew therefore the inference that Michael Angelo's design in his great church had been vastly overrated. The two shells abut at the crown upon a ring which again unites them, and on which the lantern rests. It has an opening of about twenty-five feet. This ring, like the stylobate below, contains an annular corridor, with a series of windows (sixteen) looking into the interior of the cupola. The two shells are united furthermore by sixteen great meridian arcs, or vertical webs, as it were, one over each buttress. These meridian arcs, or webs, are about eight feet broad at the base, where the interval between the shells of the dome is only three feet or so, and the whole thickness some eleven feet. At the top, where the shells are ten feet apart, the webs have tapered to three feet. The sixteen cellular spaces between them are nearly twenty feet broad at the base, and diminish to five at the top. Three tiers of dormers light them; archways through the bottoms of the dividing webs unite them; and one may walk round at the base between the shells in a continuous corridor a yard wide, to which the spiral staircases in four of the buttresses conduct him. The extrados of the inner shell is notched in courses so that each cell forms a staircase, up which the visitor may climb to the corridor which pierces the ring at the base of the lantern.

The meridian arcs may be said to penetrate the two shells, projecting above and below, in visible raised ribs. They are, in fact, the principal supporting members of the dome, and act like flying buttresses, transmitting the weight of the lantern and thrust of the whole structure directly to the buttresses below on which they rest, while the surfaces of the dome may be regarded as a series of vaulting cells filling the spaces between them. They are, indeed, whether they came first in the architect's mind or not, the real skeleton of the construction, which is therefore more Gothic than classic, and actually consists of a lantern supported on sixteen huge flying buttresses that are connected and steadied at their extrados and intrados by the shells of the dome, but capable of standing and supporting the lantern, or at any rate of being made to do it, if these shells were removed. It is, in fact, an instance on an enormous scale of the kind of structure of which the crowns that sometimes surmount Scotch towers are a type, and of which the belfry of St. Nicholas at Newcastle upon Tyne is the most famous acknowledged example, — a lantern lifted on flying buttresses, — with the difference that here the vaulting cells that connect the buttresses are supplied, while there they are omitted. Acknowledged example, we say; the distinction being one of architectural treatment, — at Newcastle the buttresses are displayed as conspicuously as possible, at Rome the chief importance is given to the domical shell with which they are overlaid. In the Gothic example they are acknowledged and vaunted; in the Renaissance they are hidden. The principle of the construction then is not, after all, that of the classic dome, — for instance, that of the Pantheon, to which tradition points as Michael Angelo's model, in which the pressure is uniformly transmitted and distributed over the ring at its base; but truly that of the mediæval vault, where the stress is collected by ribs, and concentrated into a few points where it is met by buttressing. In this respect it is more nearly mediæval than Brunelleschi's dome, where the ribs are too few and probably too slight for such an office, although they are more conspicuous in the exterior design, and would be better buttressed by the solid angles of the octagon. Michael Angelo's treatment naturally required the boldest buttressing at the points where he had concentrated his thrusts, or else very careful tying. As we know, his buttressing proved insufficient; indeed, it is difficult to see how any treatment of it compatible with the style in which he worked could have been quite sufficient. Such an example will make the architect hesitate to accept Mr. Fergusson's dictum that it is almost as difficult to build a dome that will fall as a vault that will stand. The greater caution of Sir Christopher Wren saved his construction at the expense of his architecture; but at St. Peter's, even the tying which has been added at different times has not saved the work from a steady deterioration that now points, we are told, to future ruin.

THE TEMPLE OF JUPITER AT SELINUS.

BEFORE all, in order to conceive a just idea of its grandeur, we will cite its principal dimensions, comparing them with those of a well-known monument which is properly regarded as the largest temple of modern times, — a Grecian temple, although the order is Corinthian and the proportions Roman. These comparisons have been made by M. Hittorff.

The temple at Selinus is 50 mètres (162′) in width: the Madeleine at Paris measures only 41 mètres (133′). On the long sides, the temple at Selinus measures 110 mètres, 30 c. m. (358½′); the Madeleine measures only 92 mètres (299′): so that the Made-

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leine covers only 3,722 sq. mètres (40,048 sq. ft.), while the temple at Selinus covers 5,500 sq. mètres (59,180 sq. ft.) The diameter of the columns at the base is 3 mètres, 41 c. m., or more than 10 feet: the diameter of the columns of the Madeleine is only 2 mètres, 10 c. m., or nearly two-fifths shorter. The height of the columns with the entablature is 23 mètres, 60 c. m. (76′ 9″), at Selinus; while the Madeleine measures 23 mètres (74′ 9″). With the entablature complete, the temple at Selinus measured 31 mètres (100′ 9″); with its lofty pediment, the Madeleine measures only 32 mètres (104′). But it is necessary to keep in mind that the proportions of the Doric order allow only four diameters and two-thirds to be given to the columns; while the columns of the Madeleine have nearly eleven times their diameter in height.

I could also compare the temple at Selinus with the temple of Jupiter Olympius at Agrigentum, and could show that it was larger than the Temple of the Giants.

The plan of the temple shows eight columns on the façade, and seventeen on the sides. It is the plan of the Parthenon, but how much larger is the temple at Selinus than the Parthenon!

The first glance at the plan shows us the same system as that adopted in the three other temples, — system peculiar to the architects of Selinus, and which is probably nothing else than the compromise between the needs of religion and those of every-day life. In the monuments of the following century, this confusion is no longer found.

The peristyle is widely separated from the cella; this space is so great, that Wilkins, an English architect, has been led to suppose that there were two ranks of columns; what I have said in a former article will explain this error, and the object of the architects. The peristyle was intended for the crowd: the proof is, that all along the façade not only the high steps of the stylobate are found with small steps equal to the central inter-columniation interpolated, but real steps are built before the whole breadth of the façade; these steps are eleven inches high. If we enter into the cella from the peristyle which surrounds the temple, we find it, too, arranged to receive a crowd; in fact, not only the central door exists, but it is flanked by two other doors to which correspond two doors in the wall of the rear portico, which is called the posticum. This is the arrangement of the interior, — the sanctuary backed against the separating wall, which is built very thick in order to support the weight and play of the doors; the portico of ten columns on each side in front of the sanctuary in which was the statue of the god; in the middle the court, the hypethra, an uncovered space; under the porticos the direct passage for the crowd which traversed the temple from door to door. Thus in this vast temple every thing is for the people, for circulation; the god has no real sanctuary except the most remote portion of the cella about twenty feet wide, surrounded by walls.

Thus is completed the system in which the plans of the ancient temples of Selinus have been conceived. The crowd, or at least the visitors, are admitted to the interior, and circulate from door to door under the porticos as by an alley-way. On the outside, the peristyle offers a shelter to the citizens for their public meetings; it is the *agora*, it is perhaps the market, for one cannot help thinking of the well-known passage in the New Testament which represents Jesus as chasing the money-changers from the temple. The temple at Jerusalem was a sanctuary less open than any of the temples of antiquity. Had the money-changers then penetrated into the sanctuary, into the Holy of Holies? It seems as if they must have kept themselves merely under the porticos; and to Christ's eyes, as to the eyes of a modern, that was already a profanation. The Greeks came to this conclusion later, and at Selinus they made the temples of the succeeding century inaccessible.

If from the plan we pass to the elevation of the monument, if we examine not only its disposition but its construction and its style, we recognize that it belongs to two distinct epochs, and that it presents, because of this double character, a remarkable example of the spirit of Grecian art, of its logical progress, and of its inflexible traditions.

The temple of Jupiter Olympius was never completed; this is what made Wilkins suppose that an intermediate row of columns must be added and a double colonnade established about the temple. The reason, in his opinion, was the difficulty of covering the portico with stones, with beams formed of a single stone which must be supported at the same time by the colonnade and by the wall, for these would have had to be about 11 mètres (36′) long. He believed that intermediate supports were necessary, but we shall see in an instant what immense blocks the inhabitants of Selinus knew how to extract from their quarries situated near the river Selinus. The Egyptians knew how to push still farther the employment of monoliths. Here at Paris even, do we not see the raking cornices of the pediment of the Louvre, the pediment which surmounts the facade built by Perrault, formed by two stones each more than 50 feet in length? Perrault had these two monoliths extracted from the quarries at Meudon; they have since then split in different places.

The temple then was not completed. The columns are lying on the ground, with their capitals thrown by the efforts of machines a little farther than themselves. Some are fluted, others have only a beginning of flutings; the rest are still left in the rough. They have not yet emerged from their shroud of stone; for the ancients used to do exactly what we do to-day: they blocked out the columns and capitals, and constructed the building. The sculpturing of the stone began only after the upper portions were finished, and always while lowering the scaffolding, from fear that inevitable accidents might destroy the mouldings and the sharp arrises of the lower portions of the buildings if they were sculptured first. The temples of Segestum, of Delos, and the Parthenon at Athens, present the same peculiarities. Now, not only the temple had not been finished, but the works had been abandoned in the time of Pisistratus, then recommenced in the time of Pericles, then again interrupted by public misfortunes, by the wars, so that the temple was overthrown by the Carthaginians before it was completed. Thus one must not look for sculptures in the pediment, nor sculptures upon the metopes, nor colors upon the mouldings. The columns of the principal façade, that is, of the eastern façade, and the columns upon the sides, have flattened capitals, while they themselves are excessively attenuated towards the top. This is the archaic style, the style of the times of Pisistratus. On the other hand, the rear façade, the one facing west, has columns whose shafts are diminished with much precaution; consequently the column has more force, more thickness, and its capital holds up its head with a line firm, decided, architectural, which belongs to the best epoch, to the age of Pericles. This is a remarkable fact, and shows in a striking manner what was the tradition of Grecian architecture. Nowadays what do we do when we finish a building? We continue the style, whatever may be its epoch, whether it be Gothic or Renaissance, whether it be good or bad; preferring a homogeneous monument full of unity to corrections, to innovations, which, excellent in themselves, take from the building its character and its unity. What do we see at Selinus? A temple which remains for a long time half built. Money fails; the sacrifices have already been considerable; revolutions, wars have intervened: the works are stopped. But during this time, art progresses in Sicily as well as in Greece, in the colonies as well as in the metropolis. Fifty years, sixty years, a century perhaps, have elapsed; emulation, the example of Agrigentum, a neighboring city, a rival, which constructs its temple of Jupiter Olympius after the defeat of the Persians and Carthaginians, provoke a new effort. Selinus recommences its work. What does the new architect? He follows the mode of the time: he follows tradition, — inflexible tradition. He can change nothing in the plan, nor in the proportions; the diameter of the columns, their height, — every thing is given; he must accept all. But he can change the profile of the capitals, the contour of the columns, and by this alone give them a totally different aspect. This is what he does, and without heed to the past, he gives to his capitals a pure, decided curve; he increases the thickness of the columns at their summit, at the necking, underneath the capital; he increases it by 55 centimètres. What was the effect of these two façades so different? We cannot tell; but it must be kept in mind that the effect was perhaps completely saved, because two opposite façades of a rectangle can neither be seen nor compared at the same time. It is even possible that at a height of fifty feet, — for the columns are 16 mètres, 60 c. m., high, — one could not distinguish the contour of their capitals without the closest attention; and, by reason of the perspective, the diminution of the columns, on this side very pronounced, on the other side very slight, could only be detected by skilled observers. Nothing is more fit to show how little the Greeks cared for erudition in matters of art, or, if you wish, for unity of style. They followed progress, and conformed themselves to tradition. The architect who continued the temple did still more: he changed every thing in the plan that he could. Thus the antæ or pilasters of the pronaos were originally in line with the columns; he brought them forward so as to unmask them, and by so doing conformed himself to the progress denoted by the Theseum, the Parthenon, and the noble temples of the fifth century. Moreover, on the older façade the capitals of the antæ have a form which is primitive and confused; they are two inverted volutes with a palm, — a singular mixture of Ionic elements with the Doric order, — a souvenir of the time when perhaps the two orders were not clearly distinguished. On the other hand, the capitals of the antæ of the more recent façade are conformed to the classic traditions of the best epoch; they present the crow's-beak moulding. But the difference of the two pilasters at the opposite ends of a temple was not a serious thing, and counted among the details. These disparities, dictated by a respect for tradition, must not be compared with the horrible adjustments of the eighteenth century, which used to plaster façades in its own style upon Gothic churches or Roman basilicas.

The epoch of the first foundation of the temple is unknown to us like all the rest of the history of Selinus. If we examine the scale of proportions, we see that the columns are 3 mètres, 41 c. m., in diameter, while they are 16 mètres, 60 c. m., in height, consequently the proportion is four and two-thirds diameters: that is a little greater than temple D in the acropolis of Selinus, which is four diameters and a half, while it is a little less than temple F, which counts five diameters. The construction of the temple of Jupiter should then be placed between the epochs of the construction of these two temples; but since these are unknown, any other than a relative classification must be renounced: hence the temple

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of Jupiter should be placed about the middle of the fourth century, a hundred years after the foundation of Selinus, and a hundred and fifty years before its ruin. The more modern façade must be slightly later than the Medic wars. The beauty of the materials employed for this temple strike one with amazement, and the *débris* themselves are so large that one asks one's self how it was possible to handle such blocks. But after all, it is only a question of arms and money; besides, in matters of art, size is an affair of only secondary importance. There are blocks which measure nearly eighteen feet in height by nine or ten feet in thickness. The quarries are upon the other side of the river Selinus, so that it was necessary to cross the little valley which separates the two halves of the city and the Selinus itself. One still sees drums of columns which have for twenty-four centuries remained upon the road from the quarries where they were abandoned by the teamsters. — *M. Beulé in the Revue Générale d'Architecture.*

THE ILLUSTRATIONS.

DESIGN FOR A MONUMENT TO LAMARTINE AT MACON, FRANCE. MM. DEPERTHES, ARCHITECT, AND ROUBAUD, SCULPTOR.

THIS design took the second prize.

A MONUMENT TO MUSIC. M. HOYEAU.

This monument was designed by a student at the *Ecole des Beaux-Arts*, in one of the ordinary bi-monthly competitions.

A MONUMENT INTENDED TO COMMEMORATE A UNIVERSAL EXHIBITION. M. ULMANN.

This design received the first prize in the yearly competition known as the *Concours d'Achille Leclerc.*

A MONUMENT TO COMMEMORATE THE VICTORY OF CALLAO, PERU. M. J. HÉNARD, ARCHITECT, AND M. N. J. GIRARD, SCULPTOR.

A MONUMENT IN HONOR OF THE DEFENCE OF DIJON. M. FÉLIX VIONNOIS.

This design received the first prize in open competition. It, as well as the four preceding monuments, is taken from the publication of the students of the *Ecole des Beaux-Arts*, known as the *Croquis d'Architecture.*

SOLDIERS' AND SAILORS' MONUMENT, BOSTON, MASS. MR. M. MILMORE, SCULPTOR.

See Summary.

THE DOME OF ST. PETER'S CATHEDRAL, ROME.

See leading article.

RESIDENCE OF MR. R. P. CATTRALL, CLEVELAND, O. MR. F. S. BARNUM, ARCHITECT.

DECIMALIZING BRITISH MEASURES.

THE arguments in favor of introducing the metric system are sometimes met by a proposition to reform our present weights and measures, instead of casting them all aside. Perhaps the best presentation of this plan yet published is at the close of an interesting lecture by the late Sir J. F. W. Herschel, the eminent astronomer, on "The Yard, the Pendulum, and the Metre."[1]

The lecturer is chiefly occupied with the subject of a natural basis for a standard of weights and measures. Referring with admiration to the degree of accuracy attained in the meridian survey upon which the metric system was based, he says, "Adopted as it is, over a large portion of Europe, were the question an open one what standard a new nation, unprovided with one, unfettered by usages of any sort, and in the absence of any knowledge of the existence of the British yard, should select, there could be no hesitation as to its adoption," etc.; but he is confronted with "the fact that England is beyond all question the nation whose commercial relations, both internal and external, are the greatest in the world; and that the British system of measures is received and used, not only throughout the whole British Empire (for the Indian 'Hath,' or revenue standard, is defined by law to be 18 British imperial inches), but throughout the whole North American continent; and (so far as the measure of length is concerned) also throughout the Russian Empire; the standard unit of which, the sagene, is declared by an imperial ukase to contain *exactly* seven British imperial feet, and the archine and vershock precise fractions of the sagene. Taking commerce, population, and area of soil, then, into account, there would seem to be far better reason for our continental neighbors to conform to *our* lineal unit, could it advance to the same, or a better *a priori* claim, than for the move to come from our side."

This lecture is dated in the fall of 1863. The outlook at the present time is different. Since then the metric system has been introduced in Germany, Austria, Roumania, and one or more South American countries. It has been adopted by laws which will take final effect hereafter in Sweden, and (according to the 9th report of the Warden of the Standards, British Parliamentary documents, 1875) in Norway. One of the latest reference books on this subject[1] states that in 1870 the use of the metric system was made obligatory by law in Turkey; but probably the effect on commercial transactions is not yet very great. It is worth noticing, by the way, that the countries here named constitute the entire European frontier of Russia.

Please observe too, that Sweden already had a complete decimal system, adopted in 1858, starting from her foot and pound. The metric system has been legalized in the United States (1866) and Great Britain (1864).

"An Act 'to provide for the ultimate adoption of an uniform system of weights and measures of capacity throughout British India,' was passed in October, 1875. The *ser* is adopted under the Act as the primary standard, or unit of weight, and is a weight of metal, in the possession of the Government, equal when weighed in a vacuum to one kilogramme. The unit of capacity is the volume of one *ser* of water at its maximum density, equivalent to the litre. Other weights and measures are to be multiples or submultiples of the *ser* and of the volume of one *ser* of water." This is taken from p. 180 of "Rules, Tables, and Data," the new publication, 1877, by the well-known English engineer, D. K. Clark. As for Russia, Consul-General Bodisco is quoted as stating that "the Imperial Commission sent to Paris to inquire, reported in favor of the introduction of the metric system into Russia, and the government has the subject now under advisement." The only common point between the Russian weights and measures and those of any other country is the connection above pointed out with the British foot, which was introduced by Peter the Great after his experience in English dockyards. 16 vershocks make one archine; 3 archines make one sagene. So the vershock equals $\frac{7}{48}$ feet, or $1\frac{3}{4}$ British inches; the archine, $2\frac{1}{4}$ feet, or 28 inches; the sagene, 7 feet. This amounts to about as much in the way of a simple relation as the connection of our so-called "surveyor's measure" with long measure. Suppose that Gunter's chain had never been used in England, and that the Russians instead of their sagenes and vershocks, had a chain equal to 4 British rods, and divided into 100 links, each equal to $7\frac{92}{100}$ British inches, how far would that go toward inducing them to adopt the whole British metrology, now that the rest of Europe is irrevocably committed to the metric system?

Sir John Herschel's exhaustive discussion leads him to the conclusion that the earth's polar axis is the best natural basis for a system of weights and measures. He proposes to make minute changes, which for commercial purposes are inconsiderable, in the foot, the ounce avoirdupois, and the imperial half-pint, so that the foot shall bear a simple ratio to the earth's axis, and that the half-pint shall be $\frac{1}{100}$ of a cubic foot, and shall hold ten ounces of water. This scheme is not so well adapted for the United States as for England; because neither our dry pint nor our liquid pint has any thing to do with the British imperial measure. All the capacity measures in the United States would have to be altered in order to adopt it.

Upon this admirable basis, it may be proposed to remodel our medley of weights and measures, and make a system either wholly or partly decimal. If partly, then by so much as we fail of being completely decimal, by that amount we lose the benefits of an entirely decimal system like the metric. Sir John Herschel evidently does not attach superlative importance to decimal subdivision. Besides dividing the foot into ten parts and making the cube of one-tenth hold an ounce of water, he would also retain the present division into twelve parts, and the earth's polar diameter would be expressed as 500,000,000 inches (and could not be precisely expressed in feet and tenths). This twofold subdivision of the standard unit, though it is sometimes spoken of as if it were an additional convenience, is really the source of endless annoyance. The reader who has ever tried to work in tenths from an architect's plan figured in inches, or has labored to instil into the mind of a stupid earthwork-contractor what "Cut 1. 9" means on a grade stake, can appreciate the disadvantage referred to. There is increased liability to error in reading figures on plans, if two incongruous methods of subdividing are used indifferently.

If on the other hand the remodelling should be purely decimal, there would be nothing left of the existing units in this country, except the foot and the avoirdupois ounce. If we are going to the extent of throwing aside every thing else, might we not as well drop them too, and take up the metric system? A minor consideration is worth mentioning which relates to the practical conduct of the change. When the metric units are used, the English will naturally be adopted; there will be no tendency for the foot to cling to the metre. But to abolish the yard while the foot is retained, to use the ounce constantly and abandon the pound, would be completely accomplished only after the lapse of a long time. The main question is: If we are bound to have

[1] Familiar Lectures on Scientific Subjects. Alex. Strahar. London and New York, 1866. The lecture here cited has been reprinted in "The Metric System," etc., by Charles Davies: A. S. Barnes & Co., New York and Chicago, 1871.

[1] Monnaies, Poids, Mesures, et Usages Commerciaux de tous les états du monde. Paris: Hachette et Cie., also Harre: A. Lemale, Aîné. 1875.

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a radical reform in metrology, at all events, shall we go far enough to bring ourselves into harmony with the rest of Christendom, and so oblige Great Britain to follow suit; or shall we preserve two or three of our multifarious units in the hope of maintaining a few years longer our uniformity with Great Britain's insular system, and with the possibility that Russia may adhere to the British foot?

England adopted the Gregorian calendar in 1752, which the Catholic countries of Europe had generally adopted about 1582. Russia has not adopted it yet, so that what we call the 15th of September is in Russia the 3d of September. The old Roman figures (now happily supplanted by the Arabic decimal notation) "lingered longer in England than in any other part of the European world, having found an asylum in the dark and dull regions of Exchequer." So says Sir John Bowring on p. 26 of his Decimal System (1854). In a subsequent chapter giving a history of the practice of the Exchequer, he says: "A tally was a stick (generally of hazel) prepared by an officer called the Tally-Cutter, or Cutter of the Tallies; on the tally, notches were cut, indicating the sum in the Teller's Bill, a large notch for M (or £1,000), a smaller notch for C (or £100), a smaller still for X (or £10), and so on for pounds, shillings, and pence" (p. 118, and on pp. 124, 125). "It is, indeed, scarcely credible, that the perplexing and entangled manner of keeping accounts by the Roman numerals, in the same barbarous style which was practised before the Norman Conquest, was maintained at the Exchequer almost down to the present day; and the introduction of the English language and the Arabic numerals was successfully resisted by no less a personage than Lord Granville, on the ground that if the barbarous usages of our ancestors were reformed, it would be difficult to understand the accounts, and the records of departed time." . . . "*Tallies* continued to be used down to the year 1782. It was only in the year 1831 that the Committee on Public Accounts, of which I was the Secretary, recommended the utter and immediate abolition of the ancient system, and the adoption of the Arabic numerals and the English language. It was in consequence of this change that, in the year 1834, the tallies were ordered to be burnt, a conflagration which led to the destruction of both Houses of Parliament — the Exchequer in which the tallies were kept having formed a part of the ancient edifice of St. Stephen's."

Must the United States travel in such ultra conservative company? — *Engineering News.*

CORRESPONDENCE.

THE PENNSYLVANIA INSANE ASYLUM. — NEW BUILDINGS FOR THE GIRARD ESTATE, AND FOR GIRARD COLLEGE.

PHILADELPHIA, Sept. 13, 1877.

As was remarked a few weeks ago, the Pennsylvania Lunatic Hospital bids fair to be another lost opportunity so far as concerns its architectural qualities. Literally, too many doctors in the commission. This body knows all about what it requires: it does not want that species of talent and experience which was lately referred to in the Summary; that sort of thing very rarely is wanted, much as it is needed, in Philadelphia or its vicinity, where, as in this case, an architect is very frequently employed, as it were to guess a conundrum, and from the time of his employment has to wage a constant warfare with the prejudices of his employers; for the conservative Quaker element, although no more aggressive than formerly, is far from dead.

What impression does the Board of Trustees of the American Institute of Architects hope to make by its action of the 16th of August? So far from appreciating the Institute as being any thing of a public benefit, one hears it even now referred to by intelligent citizens as a trades-union.

The fact is, any thing in the nature of art in a building is regarded as a non-essential; and although there is a vague notion in the community that an architect adds a certain something to the work which, as is generally remarked, makes it look odd, yet it is oftener considered that he adds to it not a little unnecessary expense. This is why in many important works a builder is employed to get up his own drawings, it being a popular notion that they are more practical, and, what seems to be of more importance, they are not charged for.

The commission seems inclined to regard the action of the Board of Trustees of the Institute of Architects somewhat as the railroad companies did the orders of Chief Engineer Arthur during the late strike, and to congratulate itself that, notwithstanding the resolution, "a number of very handsome plans have come in from the Philadelphia architects." Among these are Messrs. Collins & Audenreith, Furness, Hutton & Ord, Sloane, and Wilson & Thorn. A larger number have been submitted from other places, which swell the list of competitors to some twenty-five in all.

It is probable that a room will be taken in the Baptist Publication Society's building on Chestnut Street, between Broad and Fifteenth Streets, where these plans will be placed on public exhibition. The movements of the commission, it must be confessed, are somewhat crab-fashion, since, after having had numerous unsuccessful meetings to select a site for the institution, now that the plans are sent in, another effort to settle this rather important point was made on Wednesday (12th) afternoon; and after much discussion and some thirty ballots the choice was made of what is known as the Hitner farm, about two miles north of Norristown, in Montgomery County, the price being about $200 per acre.

The Girard Trust is about to build two buildings for brokers' offices on its property on Third Street, south of the old Girard Bank, extending through to Harmony court and adjoining the building which was built last year for the Board of Brokers. On Wednesday the contract was awarded to Louis Havens, whose bid was the lowest of the nine offering. The work is to be completed by the first of the coming year. Mr. Windrim, the architect of the Trust, has in progress a new chapel at the Girard College capable of accommodating 2,000 boys: this is nearly ready for plastering. The style of this building, — what is called Gothic hereabouts, — with its high-pitched roof, is in very striking contrast with the comparatively pure Corinthian of the College building itself (from which it stands about 200 yards to the westward), built from Mr. T. U. Walter's designs about forty years ago. There is something which strikes one as very strange in so prominent an ecclesiastical edifice rising within this enclosure, in view of the well-known fact that the will of Stephen Girard contained a very stringent provision that no clergyman of any denomination whatever should as such ever be admitted within the enclosure. Besides the chapel, eight new dwellings are being built to afford accommodations for 320 additional pupils, the present capacity being about 600. Two of these buildings will be ready for occupancy next month, and the others before the end of the year.

Building permits were issued during August for 466 new buildings, and 142 alterations and additions. Among the new buildings are 420 dwellings, 17 stores, 1 bank, 2 factories, and 3 schoolhouses.

LIGHTING BY ELECTRICITY.

PHILADELPHIA.

IN the *Journal of the Franklin Institute* for September will be found a letter from M. A. Sartiaux, Assistant Engineer of the Northern Railway of France, addressed to the Secretary of the Institute, from which it appears that at the merchandise station of this railway, at La Chapelle, Paris, they have now in use a system of electric lighting.

For this purpose three magneto-electric machines are employed, but they have made preparation for five machines in the construction of the building and the power of engine provided.

The machines themselves are "Gramme" of the smaller size, which the circular of the makers describes as requiring 1⅔ horse-power to run at 850 revolutions per minute, at which speed they will produce a light equal to that proceeding from 150 gas-burners burning five cubic feet of 16-candle (the stated quality at Philadelphia) gas per hour. The makers say that this quantity of light will be doubled by careful adjustment of the carbon points, where the light is evolved, and rate the power to be expended as the light evolved, thus calling for 3½ horse-power for the same machine when producing the maximum of light. M. Sartiaux estimates the power at from two-horse power to 2.9 horse-power, basing his computation of cost of light on two horse-power.

The lamps, as the machinery for holding and regulating the feed of the carbon points as they wear away are called, are those of M. Serrin. The carbons are square pencils made from the substance deposited in the retorts used in gas making, ⅜ of an inch square, 8½ inches long for the positive pole and 4½ inches for the negative pole, which burn four hours.

The lamps are placed in three-cornered lanterns, which have solid bottoms, and have a tin top when out of doors, but are open at the top in the halls. The sides are of double glass, $\frac{1}{10}$ of an inch apart, to avoid breakage from cool currents of air. The dimensions of the lantern are 18 to 20 inches on the sides by 3 feet 4 inches to 3 feet 8 inches high. The sides are clouded by zinc white to such height as will prevent the voltaic arch being seen when the lantern is in its place. A large illuminated body is thus procured, at the evident expenditure of light however, sufficiently reduced in brilliancy to be endured by the eye without injury. The rays emerging above the obscured band on the lantern are reflected, within the hall, by the whitened walls and ceiling, which serve as diffusing reflectors; but out of doors, the tin top of the lantern serves rather as a cover than as a reflector.

In the halls, a single lantern placed in the middle, at the height of 16½ feet, gives a general light, without troublesome shadows, sufficient for the recognition and handling of packages for a radius of 110 to 125 feet. Out of doors, a lantern placed at the height of 20 to 23 feet admits the management of the cars within a radius of 200 to 270 feet.

M. Sartiaux estimates for these three machines and lanterns, running ten hours: —

Motive power	$1.37
Mechanic	1.00
Carbons	.90
Ten per cent of cost per year, per day	1.26
Oil, repairs, etc.	1.00
Total	$4.73

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These figures should be altered to apply to American conditions, and the following will give a liberal estimate.

For three Gramme magneto-electric machines, with Serrin lamps running ten hours per day (or night):—

Six horse-power, at 40 cents per day of ten hours[1]	$2.40
Mechanic in attendance ten hours . . .	$1.75
Carbons	1.35
Twenty per cent of cost of electric machinery [2]	2.25
Total for ten hours	$7.75

Comparing this with light from gas-burners in Philadelphia, and accepting the evolution of light from each electric lamp as equal to 150 gas-burners of five cubic feet per hour, burning 16-candle gas, we have, —

Three lamps × 150 gas-burners × 5 feet × 10 hours,
= 22,500 feet of gas at $2.15 per thousand . $47.93

This estimate makes electric lighting to cost, in Philadelphia, about one-sixth that of gas lighting wherever the quantity of light required is so large as to make the electric system available.

It may be admitted, however, that in lighting by gas of most public places or buildings, the gas-lights themselves may be arranged, and generally are arranged, so that they are not more than ten or twelve feet on the average removed from those persons who require or use the light, while the electric system will demand about twice this average distance. As the quantity of light supplied will vary as the square of the distance from the objects lighted to the source of light, it follows that four times as much light must be provided by this electrical agency as is required in ordinary arrangements for gas lighting. (The value of the reflected light from the electric lamps may be accepted to balance the necessary obscuration of direct rays emanating from the voltaic arch.) This assumption of allowance will yet preserve the superiority of electric lighting as half as expensive as gas lighting.

Beside the question of economy, questions as to relative healthfulness, comfort, or safety from fire, may be considered.

As regards the first of these, with electric lighting the production of irrespirable gases of combustion — the vitiation of air of a room — almost entirely ceases. The products of combustion which accompany electric lighting are almost inappreciable. The three lamps referred to burn or consume (for some is not burned) 9½ inches of carbon pencils, ⅜ inch square, per hour. The weight of carbon is possibly an ounce and a half; and the resulting quantity of carbonic acid gas is, if the carbon is really burned, 2½ cubic feet. While for comparison, taking the gas lighting as four times as efficient in practice as the electric, so that 5,625 cubic feet of gas shall be assumed to give as much effective light as the three electric lamps, we have a consumption of 562½ cubic feet each hour; a volume of gas equal to 17.9 pounds, which will produce no less than 227 cubic feet of carbonic acid gas, and about 87 pounds of vapor of water. The quantity of oxygen taken from the air for burning this gas is 95.5 pounds, while the air needed for complete combustion — that is, twice as much as contains the oxygen really burned up — is 11,600 cubic feet per hour.

The comfort of a room is materially affected by the heat emanating from lights. With electric lighting it may not be proper to take the heat of combustion of the carbon points as the sole heat evolved; for this, when computed, amounts to only the equivalent to heating 1,200 pounds of water one degree each hour, or 20 units per minute. But there is a more accurate way of regarding the heat of electric lights. Whatever may be the source of power which drives the magneto-electric machines, or however wastefully or economically the prime mover may have been used, the quantity of heat produced by electricity or otherwise *from* the machines cannot exceed the theoretic equivalent of heat. One pound of water heated one degree Fahrenheit represents 772 pounds lifted one foot in height. Having 6 horse-power as the power needed to drive the three Gramme machines, we transform the horse-power into pounds lifted one foot high each minute, by multiplying by 33,000, giving 198,000 foot-pounds, and dividing by 772 foot-pounds, it follows that 256½ pounds of water heated one degree represent all the heat *possible to proceed* from the motive power imparted. Much of this heat may be lost in friction, or in the heating up of the machines themselves; but for this estimate let us accept this quantity of heat as given possibly from electric lamps each minute, in lieu of the 20 units which proceed from burning of carbon points. The gas consumption has been accepted as 562½ cubic feet per hour, — 9.375 cubic feet per minute; which in burning will give out 10.125 units of heat, to be dispersed by radiation, or to pass off with the products of combustion. These figures show the relative heating effects of electric and gas lighting, with every assumption in favor of the latter (and particularly the assumption that only one-fourth as much light is to be supplied by gas-lighting), to bear the ratio of *one to forty*. In these figures also, we have taken the two horse-power per machine given by M. Sartiaux in his estimate, while the Gramme machine-makers assert that 1⅓ horse-power suffices; we incline to accept which assertion as the result of actual trials. Accepting this value, and supposing a case where the gas-lights are placed above the ceiling of a room or hall, so that electric lighting would apply on an equality of distance from the audience, the heat proceeding from electric lamps would compare with that from gas-lights, as *one to one hundred and ninety-two*.

The question of relative safety from fire of the two systems, in theatres especially, is too important not to merit remark; but after bringing it before the reader, no comment is needful. The dangers of leaky gas-pipes and fixtures, disastrous explosions, the feeding of flames by gas when accident occurs, all disappear before the harmless wires which convey the electric current to sources for illumination.

With all these advantages there remains yet another. The electric light is the nearest possible to the natural one of the sun. With proper disposition of lamps, the room or space is filled with light, so that the ceiling, walls, floor, or the objects within a room become, as they do in daylight, sources for reflected light, diffused and distributed without glare or fatigue to the eye. Colors have their natural values and tints. The gratification of the most delicate sense is not the least of the promises in the future perfection and application of electric lighting.

ROBERT BRIGGS, C.E.

[1] The above price is $125 per year, per horse-power, and is a full profit rate for power supplied in small quantities.

[2] This percentage is to cover interest, repairs, oil, etc.

CIRCULATION OF HOT WATER IN BUILDINGS.

MR. F. G. BRAMWELL, on the closing day of the meeting of the British Association, read a paper in the mechanical section on a new mode of circulating hot water throughout very large buildings, and upon a new mode of softening water, as carried out at the new lunatic asylum (the third) for the county of Middlesex, situated on Banstead Downs, in Surrey. The author stated that this asylum extended over many acres, comprising as it did numerous separate "blocks," as they are technically called, for the reception of the patients, for infirmaries, the administration department, and other purposes. In order to obtain economy and simplicity in management, it was desirable that the whole of this extensive acreage of buildings should be heated and supplied with hot water for baths and other purposes from one source of heat. It was well known that in a single house, or even in a single large building, the circulation of hot water could be automatically maintained by the mere difference in gravity between the hotter ascending column of water and the cooler and heavier descending column. The power thus obtained, however, was wholly inadequate to cope with the thousands of yards — miles indeed — of pipes at Banstead. To overcome the difficulty, and to enable the building to be warmed and supplied from a single source of heat, the author had devised the plan of placing in the engine-house a centrifugal pump, which forced the water along the outgoing main, and exhausted it along the return main. These mains were conveyed side by side in trenches throughout the whole enormous establishment. They were not connected at their ends, but at each block of buildings a pipe, controlled by a valve, led the hot water into that block, and supplied the whole of the heating coils therein, the outlet pipe from this system of coils being united to the return main. Thus the water circulates through each block with the velocity due to the difference of pressure between the outgoing and the return mains, instead of circulating with the feeble velocity arising from a mere difference in temperature. It would be seen that there was practically no waste of fuel in the employment of steam to work the centrifugal engine, because the waste steam of the engine was used to aid in heating the water. This system of forced circulation would render it possible to lay on to groups of buildings, such as streets of workmen's dwellings, a supply of hot water for heating their dwellings, and for washing purposes.

The water was pure spring water obtained from a deep well in the chalk, of about seventeen degrees of hardness, and therefore a perfectly fit water for dietetic purposes in its natural condition; but on being boiled it deposited the carbonate of lime in the boilers and pipes through which it was conveyed, and thus the author of the paper was led to urge upon the magistrates the necessity, if they wished to preserve their boilers and heating apparatus from being coated with carbonate of lime, of softening the water by Dr. Clark's process. This process is known to many as an extremely beautiful and simple one. The hardness of chalk waters depends principally upon their containing a certain amount of bicarbonate of lime in solution. Lime is soluble in water readily, bicarbonate of lime is soluble in water readily; but carbonate of lime is insoluble. If, therefore, the bicarbonate could be converted into a carbonate, it would be deposited from the water, which would thus become soft. This conversion of the bicarbonate into a carbonate is effected in Clark's process by mixing with the natural water containing the bicarbonate a small portion, one-tenth to an eighth, of water in which lime has been dissolved. On these waters being united, they instantly become milky; and after being allowed to stand for some hours the water again becomes bright, the carbonate of lime having fallen to the bottom. This operation, however, it will be seen, requires very large depositing tanks, and a considerable expense, therefore, in plant; but Mr. Porter has recently invented an improvement upon Clark's process, which appears to promise excellent results, and has, after experiment, been adopted at Banstead. The principle

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and mode of treatment, as far as the chemistry is concerned, are precisely the same as Dr. Clark's; but instead of waiting the slow process of deposition to separate the carbonate of lime from the water, the mixed water is passed through filter-presses of a peculiar construction, wherein the carbonate of lime itself is made the filtering medium for itself; and in this manner, within a quarter of an hour of the mixture having been made, perfectly pure and soft water issued forth. There are four presses at Banstead, and these are sufficient to filter an average hourly quantity of 60,000 gallons of the purest and softest water, which is pumped into the tank on a tower eighty feet high. The tank contains 240,000 gallons. Six-inch pipes, so as to avoid friction, are laid all over the asylum, and internal and external hydrants are fitted thereto. Moreover, if a fire continued so long that the tank was exhausted, the engines which draw the water from the well and raise it into the tank can be caused to act direct as fire-engines. The whole of the work, except the Porter-Clark process, has been carried out by Messrs. Eastons and Anderson; and the author of the paper was the engineer to whom the Middlesex magistrates confided the design and superintendence of the work. — *The Architect.*

NOTES AND CLIPPINGS.

THE ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS. — The Eleventh Annual Convention of the American Institute of Architects will be held in Boston, commencing on Wednesday the 17th of October next. The proceedings will occupy three days. It is proposed to hold morning sessions on Wednesday, Thursday, and Friday, and evening sessions on Wednesday and Thursday. The afternoons will be devoted to visiting the principal buildings erected in the city and the immediate neighborhood since the Institute last held its Convention in Boston, especially that part of the city rebuilt since the fire of 1872.

A SOLDIERS' MONUMENT. — On the 12th inst. a soldiers' monument was dedicated at the National Home in Dayton, O.; it consists of a massive base and towering shaft surmounted by the statue of a private soldier. The base is of limestone, 11 by 6 feet; the second block is of White Mountain marble, 5 by 3 feet; the shaft is of marble 43 feet high, and comprises twenty blocks; the statue is 19 feet high, and represents a soldier on guard, and is said to be admirably sculptured. The work was designed by the veterans, and executed by Messrs. Struther of Philadelphia. The statue faces east. The inscriptions on the block are: on the east, "Erected by the officers and members of the National Home;" on the north, "These were honorable men in their generation. — *Eccles.* xliv. 7;" west, "MDCCCLXXIII;" south, "To our fallen comrades." The statue was cut from a solid block, and weighs 5,000 pounds. The cost was $2,800.

THE ADAMS CLAIM. — At the last session of the Massachusetts Legislature a bill was passed providing for the submission of the claim of Edwin Adams against the commissioners for the erection of the new insane asylum at Danvers, for extra work, and detention and loss by delay, to a board of arbitrators consisting of Francis E. Parker, L. Miles Standish, and Benjamin F. Prescott.

The claim, including about $3,000 balance due on the contract and interest, amounted to about $52,000. Previous to the hearing at the Legislature, the consulting architect, Hon. N. J. Bradlee, offered to pay Mr. Adams about $23,000 with interest for the extra work, in addition to the amount due on the contract. Mr. Adams refused to accept the offer, and preferred to go before a board of arbitrators. The Board commenced their consideration of the bill the 18th of May, and the arguments were made on Aug. 11 and 13; the commissioners being represented by ex-Gov. Gaston, and Mr. Adams by Solomon Lincoln, jun. The award was recently made and returned to the Supreme Court, and was opened on Tuesday. The arbitrators find that the Commonwealth should pay $27,430.85 in full satisfaction and discharge of all claims and demands of said Adams against the Commonwealth, in respect to the matters contained in the bill, except the items 389 to 421 inclusive, which relate, according to the bill, to "fitting on cobstone," but which Mr. Adams asks to amend by inserting in place of the above words the words "on underpinning and first belt." In case the Court rules that the amendment may be made, the Board awards $482.31, including interest, for those items. The Board further determine that the Commonwealth shall pay the said Adams his costs of court, costs of witnesses, and other taxable costs incidental to the reference, including the sum of $3,300, which they charge for their fees. Deducting the balance due on contract, $3,000, and interest, about $2,000, the award in principal amounts to about $22,500, a little less than Mr. Bradlee's offer, and $24,000 less than the claim. The report is to be passed upon by the Court, and may be approved or recommitted.

FRESH-WATER DOCK FOR IRON-CLAD VESSELS. — The Board of Engineers have begun the examination of Elizabeth River, near Norfolk, with a view to constructing there a fresh water basin for the storage of iron-clads. It was thought last Spring that a good harbor and beach could be made for them at Port Royal, but upon thorough investigation that place was found to be unsuitable; and the action of salt water upon iron-clads being so injurious, the Secretary has decided to take prompt action for their preservation. League Island is not available on account of ice in winter.

A NATURAL PHENOMENON. — There is said to be a well in Wise County, Texas, one hundred and ten feet deep, which ordinarily has an abundant supply of water at all seasons of the year, but from which, when the wind blows twelve hours from the north, no water can be drawn.

STATUE OF ANDREW JOHNSON. — A colossal marble statue of Andrew Johnson, which is to be erected near his old home in Tennessee, is now being cut in Philadelphia.

EXPLOSION IN A CHURCH. — There was a curious explosion in the First Presbyterian Church at Plattsburg, N.Y., last Thursday, says the New York *Tribune*, the windows being blown out, the furnaces shattered, and the ceiling ruined. Those who entered the main audience-room found it filled with gas, the carpets and cushions blazing, several of the memorial windows ruined, three small arched windows over the organ completely shattered, and the heavy outside front door blown out into the street. The statement of sexton Prindle is that he spent a portion of the day in the main room, sprinkling benzine upon the cushions and carpets, according to directions given to him, to kill the moths with which the carpets and upholstery were infested. He thinks that about two-thirds of a barrel of benzine was used in this manner. After finishing his work up stairs he went down into the lecture-room and made his preparations to start a fire in the furnace in the south-west corner. He cut kindlings and lighted a match, when a shock came which threw him fifteen feet and rendered him insensible.

YALE SCHOOL OF FINE ARTS. — The late Mrs. Caroline M. Street, according to the terms of her will, which has been admitted to probate in New Haven, bequeathes $50,000 to Yale College to create a fund for establishing professorships in the Yale School of Fine Arts. The professor of painting is to be also "Director of the School of Fine Arts." He must be a practical artist, of acknowledged ability in the profession, a member of the New York Academy, and of the old approved school. The will selects John F. Weir as the incumbent, at a salary of $3,000 per annum, and the professorship is to be called the "William Leffingwell Professorship." The interest of the $50,000, after deducting the salary of the professor of painting, shall be used to commence a foundation of a professorship of drawing and kindred duties, to be called the "Street Professorship." Twenty-five thousand dollars is given in a codicil to the will, the interest of which is to pay a salary of $2,500 per annum to the professor of drawing, and to the purposes of art. The Yale School of Fine Arts was founded about fourteen years ago by the late Augustus Street, and a fine building was erected for its accommodation according to the terms of his will. His widow has now handsomely endowed the institution, and made it independent of the college.

THE GUARANTEE TRUST CO.'S BUILDING, PHILADELPHIA. — This structure, built from plans prepared by Messrs. Furness and Hewitt, is a modification of the Venetian style; and its unique appearance, and the strong contrast it presents to the buildings in the vicinity, make it especially prominent. The exterior is of the finest pressed brick, laid in black cement, ornamented with light Ohio stone, polished Scotch granite, and encaustic tiles in bright colors. The prominent features of the front elevation are two square towers, one at each corner, which are seventy feet high, crested with carved stone and with rods of iron and slate. The treasury, which is entered from the body of the building through iron doors, is a room 28½ feet wide, 49′ long, and 40′ high, which contains the great fire and burglar proof vaults of the company. These vaults, six in number, are arranged in three stories, two on each story, and are reached by galleries and iron stairways. They are constructed of interior walls of hardened iron and steel plates 2½ inches thick on all sides, top and bottom, and 3½ inches thick at all corners, having outer and inner doors of solid welded iron and hardened steel plates, clear of bolt work. The iron and steel work of the vaults is enclosed on all sides by massive walls of dressed granite blocks, each 6′ to 8′ long, 2′ high and 2′ thick, the front being 4 inches thicker. All these are laid in cement, and securely clamped and dovetailed together. The roof of the top range of vaults is two feet thick, and is constructed of nine immense blocks of granite weighing variously from eight to thirteen tons. Between the granite and the steel walls a space of three inches is filled with hydraulic cement, which has now become as hard as the granite itself, and which renders the vaults perfectly dry. The foundations are of solid granite, and extend twenty feet below the level of Chestnut Street, the entire excavations being filled in with stones of great size and weight, which were laid by machinery in cement. The lower stone courses of this foundation are laid below the water-level, to make it more impossible to undermine the vaults. Each of the vaults is 18′ deep, 10′ wide, and 7½′ to 8′ high. On the sides are arranged the safes, which enclose long tin boxes suited for the reception of documents of any kind. These safes — of which there are 2,000, and space for 6,000 — have each a key which is fitted for no other lock in the building. The walls of these safes are entirely distinct and separate from the walls of the main building. There is, in fact, a space wide enough to permit a person to walk entirely around the vaults. Nor does the roof of the vaults reach the roof of the building by about twelve feet. The doors leading to the vaults are marvels of ingenuity; even the keyhole, which has proved such a handy receptacle for gunpowder, is conspicuous by its absence. These doors can be opened but by two persons, and neither of these persons sleeps in the building. There are in another department of the treasury-room storage vaults, where are deposited plate, bullion, and valuables of too bulky a character to be placed in the vaults.

THE SHELTER OF A GOOD NAME. — A gang of sharpers recently set up business in New London, Conn., under the name of Sutton & Co., architects. Gambling was their principal business, hence Mayor Waller ordered them to leave town.

TO FASTEN LETTERS ON GLASS. — To fasten metal letters on glass, use a cement made of fifteen parts of copal varnish, five parts of drying oil, three parts of turpentine, two parts of oil of turpentine, five parts of liquefied marine glue; melt these together in a water bath, and then add ten parts of dry slacked lime.

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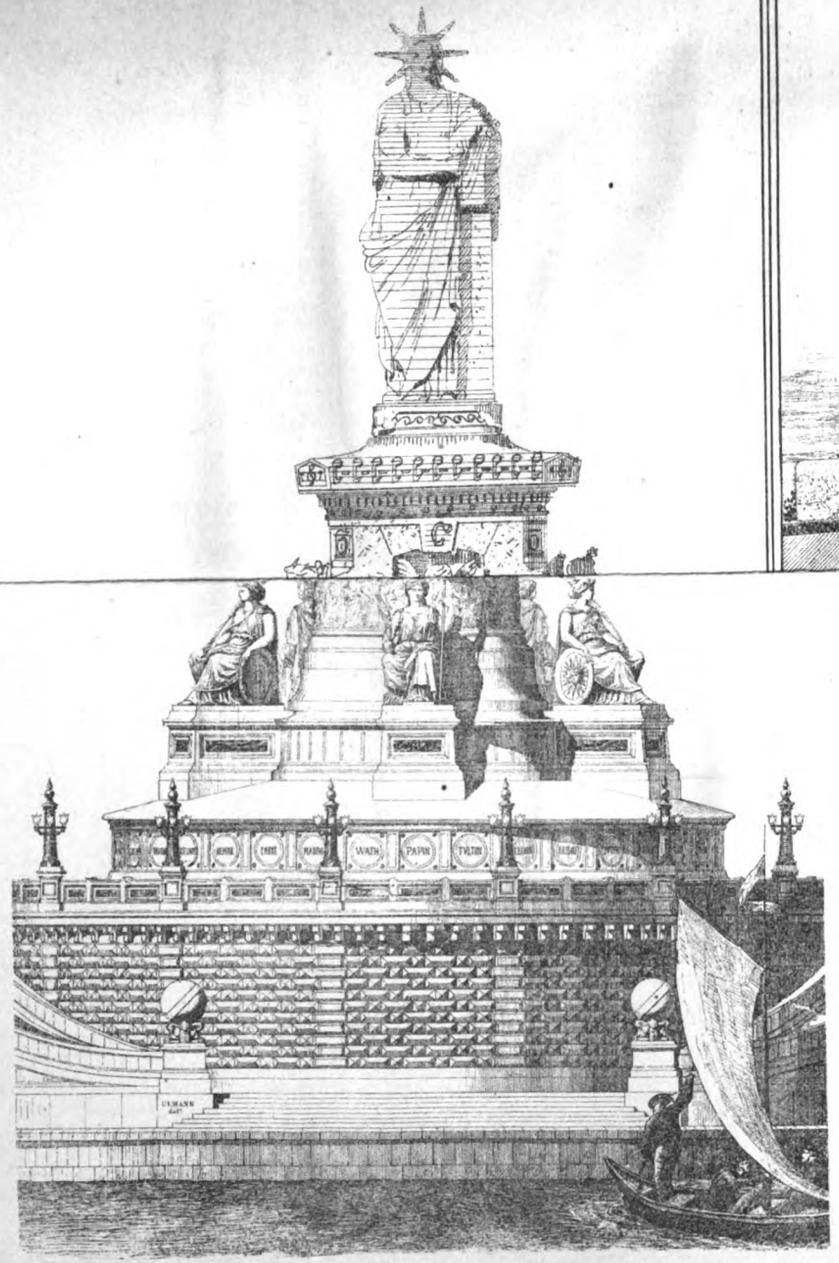
4TH PRIZE. M. MAUDREMER.



A MONUMENT TO COMMEMORATE A UNIVERSAL EXHIBITION
M. ULMANN.

A MONUMENT TO COMMEMORATE THE VICTORY OF CALLAO.
M. HÉNARD ARCHT AND M. GIRARD SCULPTOR.

THE HELIOTYPE PRINTING CO. 220 DEVONSHIRE ST. BOSTON.

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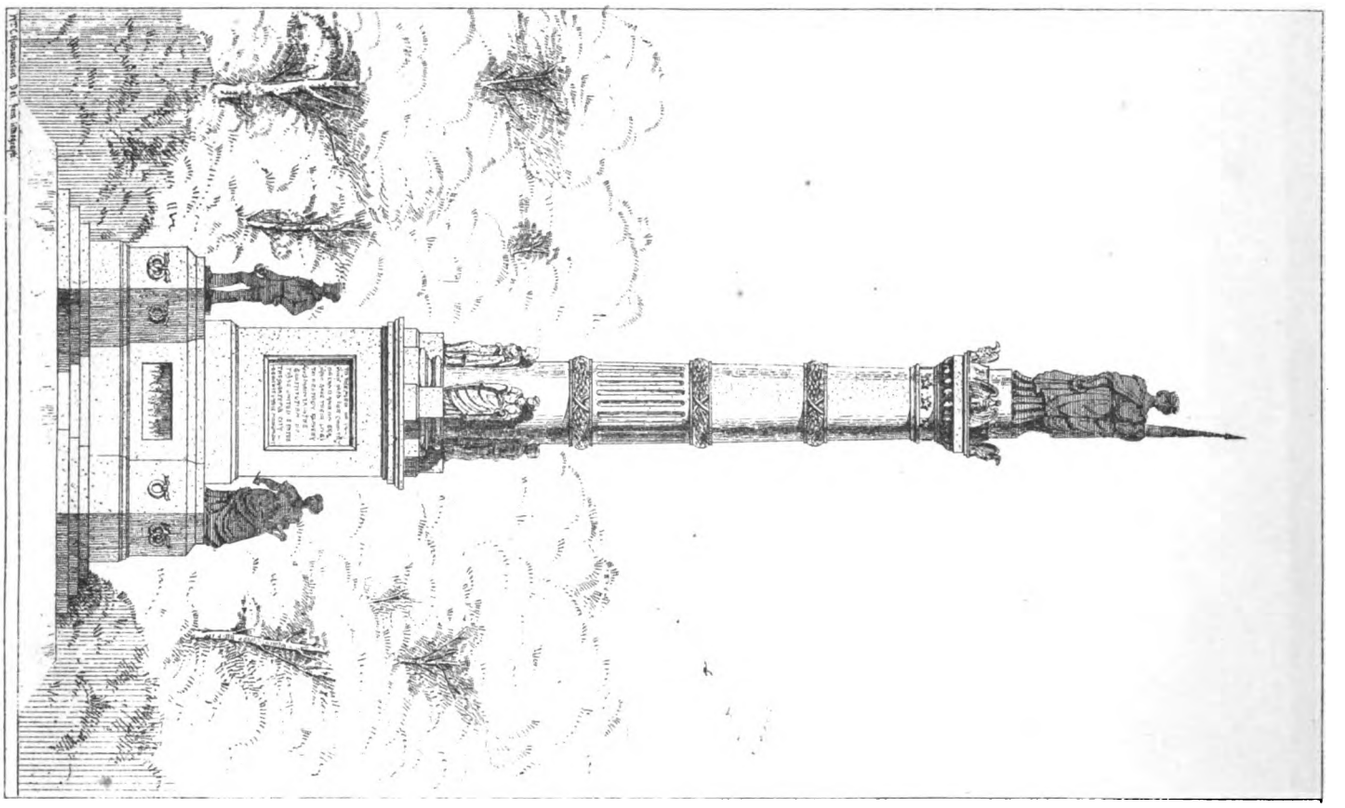
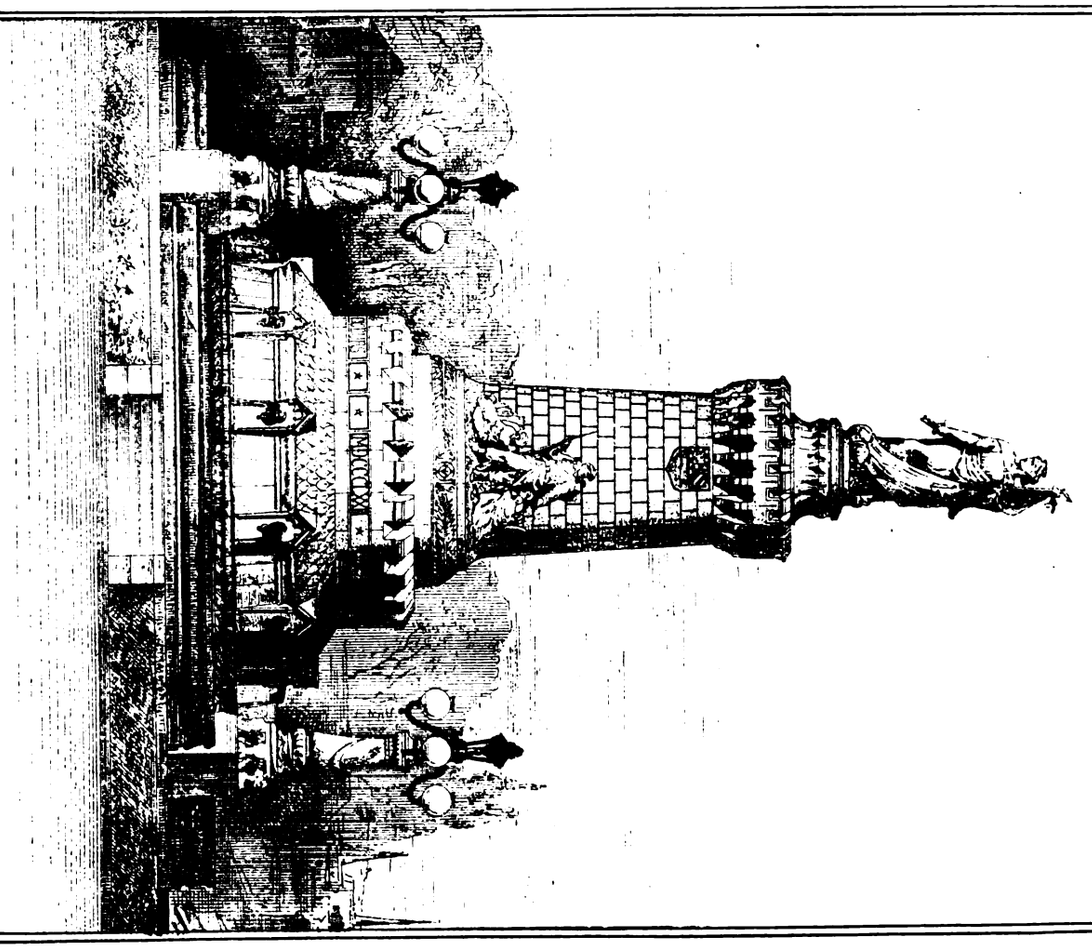


THE SOLDIERS' AND SAILORS' MONUMENT, BOSTON, 1877.



A MONUMENT IN HONOR OF THE DEFENCE OF DIJON

M. FÉLIX VIONNOIS ARCHT.

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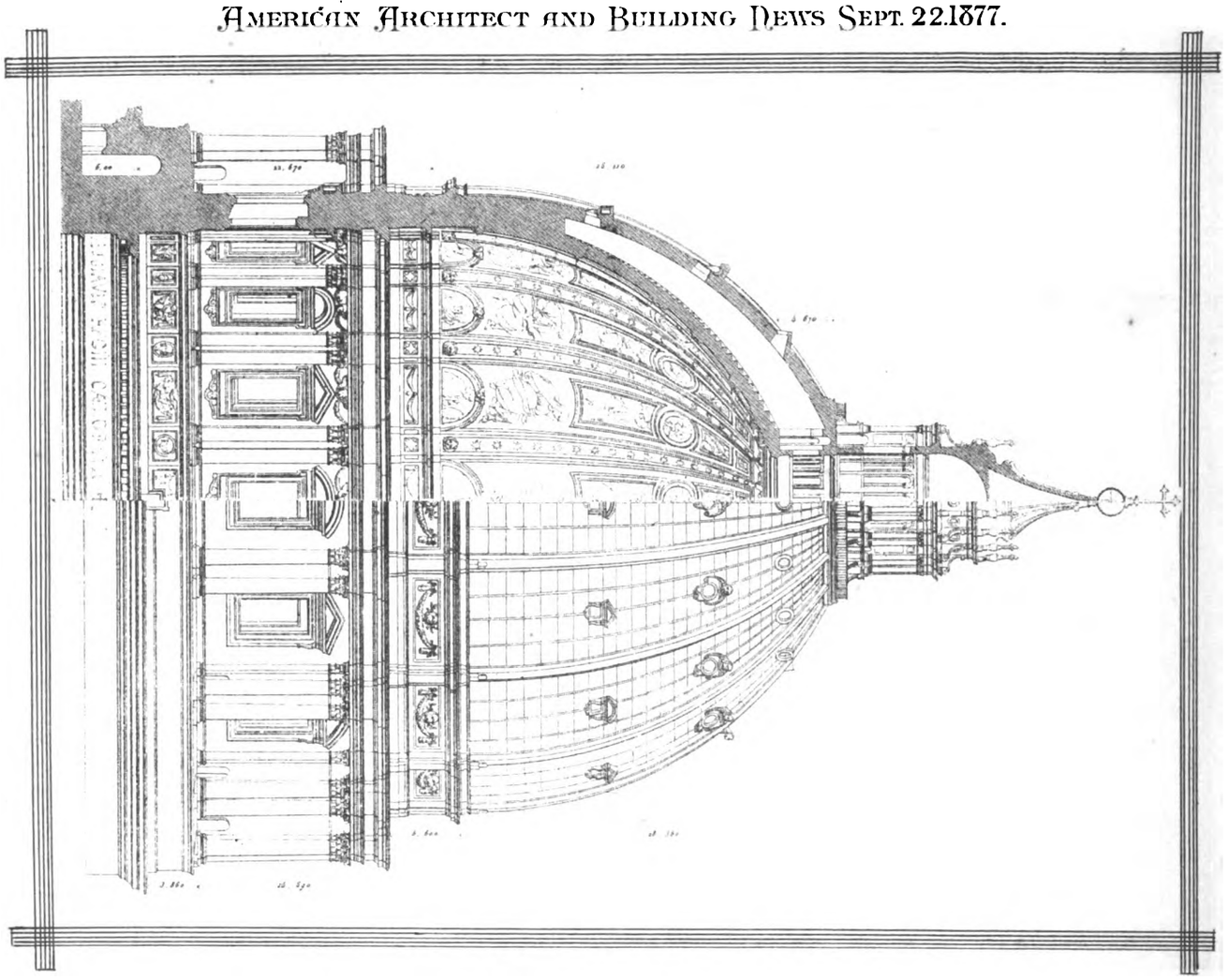
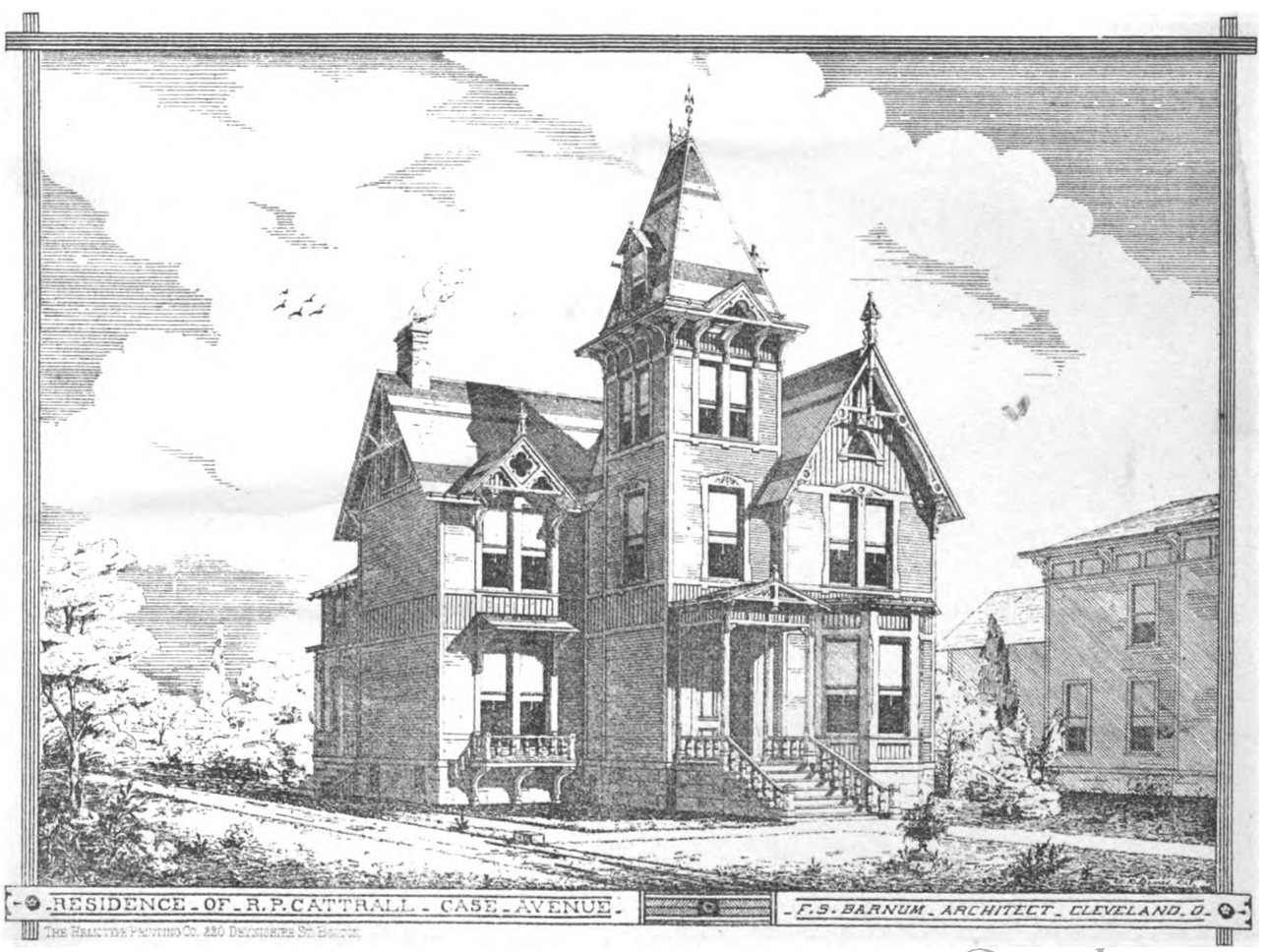
THE DOME OF ST. PETER'S.





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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, SEPTEMBER 29, 1877.

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THE committee appointed to examine the construction of the platforms erected for spectators of the procession at the dedication of the monument in Boston, on the 17th inst., and to ascertain the cause of the fall of one of these structures, whereby many people were seriously injured, have reported that "the structure was entirely inadequate for the purpose for which it was erected, every principle of strength being violated in its construction;" that it was nailed and not framed together; that the transverse braces were insufficient, and that there were no longitudinal braces whatever. The committee acknowledge that their judgment is liable to be influenced by the event of the fall, but they "cannot conceive how mechanics inspecting these structures with *any care* should have pronounced them safe." This is severe, but not in all respects satisfactory. It is impossible to conceive of a structure in which every principle of strength is disregarded, and it is quite possible that no one but a skilled engineer could survey the staging as built and detail all its weak points. Such skill is not paid for, and we have no right to expect it in the Inspector of Buildings and his assistants; but of course we have a right to expect from them such elements of knowledge as might provide for the erection of reasonably secure stagings. The joint committee of the Aldermen and Council have yet to report as to the causes and responsibility of the accident; it is therefore proper to abstain from an expression of opinion, and to defer any remarks as to the published statements made by Mr. Paul, the alleged contractor. It is evident, however, that the Inspector or his assistants should be held to a strict accountability for their share, if any, in this unfortunate occurrence: a previous good record of vigilance and competence should of course have its due weight in summing up their case, and if, moreover, this accident may be properly laid up for their benefit as a lesson of experience impossible to be disregarded in the future, the public may be no loser by their retention in office.

A STORY is told of a retired architect in one of the provinces of France, who, induced by the requests of his neighbors, took up his pencil again, and prepared plans for a certain public building; but with the express understanding that he was not to be concerned in the erection thereof. While in process of construction the building fell, or some portion of it proved insecure; and the architect, notwithstanding the exceptional conditions of his service, was condemned under the strict laws of France, to fine and imprisonment. He was ruined in his estate, and died before his release; and his funeral was attended by the principal architects of the country, and by a great array of his fellow-citizens, who desired in this manner to bear testimony to their sympathy and respect. Doubtless to the discipline of such laws, even though admitting of no discretion on the part of those who administer them, is to be attributed the gradual formation of those traditions of construction under which France now enjoys an almost complete immunity from such catastrophes as we have grievous occasion to record every week in this country. A profession carrying with it such grave responsibilities would not be eagerly embraced by half-instructed youths, who must needs complete their education at the expense of the indulgent relatives, friends, or neighbors who employ them, who must be dependent upon the skill of draughtsmen acting in the capacity of dry-nurse, and upon the honesty of contractors working after impracticable plans. An architect liable to personal punishment would take pains to calculate his strains, his weights, and the strength of his materials; to study his fire-escapes and other contrivances for the security of life, and zealously to supervise the construction of his piers and arches and ties; and a builder, under the same circumstances, would neither construct nor advise as to the construction of a staging, without far more careful consideration than he seems to bestow under our present happy-go-lucky system, in which neither forethought nor caution is encouraged. Yet it cannot be denied that such tragedies as the burning of the Brooklyn Theatre, of the Southern Hotel at St. Louis, of Hale's piano-factory at New York, or the fall of the dome of the Rockford court-house, or of the roof of the New York Post Office, or even of the temporary staging in Blackstone Square, are impossible in Paris, and would be impossible in Brooklyn, St. Louis, New York, Rockford, and Boston under laws by which the safety of the citizen is secured by the peril of the builder.

THE burning of a part of the Patent Office at Washington gives in one catastrophe a compact and conspicuous example of both the value of fire-proof construction and the dangers of its neglect. The form of the building is well known. It was entirely isolated and occupied two blocks, extending from F Street to G, and from Seventh Street to Ninth,—a rectangle with an open court in the middle. The floors were of brick and iron; but the roof, and we presume the ceiling of the upper story, was of wood. The whole of the upper story was devoted to the model rooms, which made the circuit of the building. Fire caught in the roof at the south-west angle, the corner of F and Ninth Streets, the wind being from that quarter, and swept round by the north-east to the north-east angle, at G and Seventh Streets, destroying the half of the model room in which the greater part of the models was stored. The fire-proof floors saved the contents of the two lower stories, in which were the records of the Patent, Pension, and Land Offices, from damage, except by water and efforts at removal. There are various estimates of the value of the models destroyed, probably all untrustworthy; but the cost and injury occasioned by the interruption of the public business, and by the litigations which are likely to follow from the destruction of models and confusion of records due to hasty removal, are incalculable. There are also various conjectures of the cause of the fire; but the cause matters little: the important thing is that for want of some thousands of dollars spent in carrying out a system of construction that was well begun, public property and records of immense value have been destroyed or impaired, and a whole department of the government is thrown into disorder. Incidentally, too, we are reminded of the danger of storing enormous quantities of models, mostly built of inflammable materials, in immense halls unbroken by cross walls.

THE Boston *Herald* draws attention to a scheme of fraud which has proved practicable under the system of submitting public work to a public competition of tenders of contract or bids. Although this species of fraud and many others have been developed even in the experience of private practice, the unrestricted competition implied by advertising for proposals, as is very properly required in municipal work, renders such work particularly liable to criminal practices on the part of the bidders. The especial instance of fraud noted by the *Herald* is a collusion between two competitors. The one figuring to be the lowest bidder frightens all other contestants from the enterprise by allowing the lowness of his estimate to be known among his craft before it is submitted. His coadjutor, on the other hand,

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figures for a large profit. This arrangement practically confines the tenders to two. The award is made to the lower one, which is forthwith withdrawn, and the job naturally falls to the secret associate. It is almost impossible to prove such attempts at imposition. The remedy proposed by the *Herald* is to add to the order, compelling the award of contracts to the lowest bidder, a provision requiring each competitor to file with his tender a satisfactory bond binding him to undertake the work if he receives the contract. Such a provision, although it might act as a hardship in such cases as the submission of a bid which is lowest by reason of a misapprehension of the terms of the specification, or through an honest error of computation, or which is rendered unprofitable by an unforeseen rise in prices of labor or material, or by the withdrawal of a sub-bid, would even in such cases defend the public interests from carelessly-considered propositions and probably from most cases of intentional fraud.

THERE is exhibited at the opening of the first winter terms of the schools of high art and of industrial art throughout the country, as might have been expected, an increased desire for instruction in these departments, and an increased appreciation of the importance of such knowledge as is to be obtained there. The applications, for instance, for admission to the School of Drawing and Painting connected with the Boston Museum of Fine Arts, as compared with those of last year, are in number nearly or quite doubled. Thus after the long era of indifference comes the awakening; and the awakening is sudden and wide-spread. At the first Paris Exposition our government stood at the foot of the list of great nations in industrial art. Great Britain stood next, while Switzerland and Belgium were high up on the roll of honor, France meanwhile easily leading the world. But the Philadelphia Exposition changed the record; and though we still occupied an inferior position on the list, England exhibited the advantages of that system of education in art which she has cultivated for the last fifteen years, and found herself among the foremost not in honor only, but in the profit accruing to her manufactures from the application to them of the true principles of design. We have, then, the advantage of her experience and her methods. It is important for us to understand in the outset, that the impulse given to these newly-awakened energies in our own country by the Centennial comparisons should be seconded by the establishment of proper systems of education in art; otherwise these precious forces will be wasted in unprofitable channels. How to make the most of these energies, is no easy problem to solve. Of one thing, however, all aspirants may be assured: the system which makes the apparent progress towards a knowledge of the principles of art easy and comfortable is to be distrusted. There is no way to such knowledge save by long and patient labor, skilfully guided by competent instructors and encouraged by museums of art. Where such instructors and museums exist, there is the place for the pupil in art. Without these, even genius is fatally delayed, and the most honest desire for improvement is of no avail. The processes of art are too difficult to be mastered without the aid of constant advice and the enlightenment of great examples. The city which fails to furnish these appliances of instruction in art fails in its duty to its citizens, and neglects what the development of civilization has plainly proved to be for its highest interests.

THE government buildings of a country must necessarily be considered the highest architectural expressions of the times in which they are erected, and therefore to this extent are typical. How the best ability of the profession is to be made available in the designing and building of these structures becomes naturally a question of great importance; and the practice of different countries in this respect presents curious contrasts. We have had frequent occasion to express the unanimous sentiment of the profession in this country as opposed to our own custom, which consists in the appointment by the Secretary of the Treasury of a supervising architect, to whom are committed the designing and construction of all the government buildings throughout the land, — a custom against which the earnest remonstrances and recommendations of the last two incumbents of the office, backed by the whole profession, have apparently fallen upon ears absolutely indifferent to the true interests of art, although these appeals have been presented to Congress in a form to be acted upon with intelligence and effect. If we have been disposed to consider the profession of architecture singularly unhappy in its relations with our government, and that these relations are indicative of a characteristic absence of one of the elements of civilization in our country, we may obtain some consolation by the reading of two noticeable articles in late numbers of the English *Builder* (pp. 852 and 897), entitled "The Story of the Government Offices," and "Her Majesty's Office of Works and Public Buildings." Until shortly after the advent of the famous Mr. Ayrton as first commissioner in this office, it enjoyed the professional advice successively of Mr. Pennethorne and Mr. Fergusson. Under the present administration the department seems to be a fair example of a "circumlocution office," with plenty of commissioners, secretaries, clerks, examiners, surveyors, and superintendents, *but no architect*. Evidence lately given before a committee of the Commons by Mr. Mitford, first secretary of the office and author of "Tales of Old Japan," set forth the opinion of this official to the effect that he knew of no single building erected by architects within the last twenty years which has proved superior in any respect to the old building which it replaced, and that any new buildings which might be hereafter required could be infinitely better built by the office itself without an architect, but with the assistance of *a few temporary draughtsmen*. The immediate cause of dissatisfaction seems to be the new Home and Colonial Offices lately erected in great splendor by Sir Gilbert Scott, but which, reasonably or not, the clerks of the government find less convenient than the bed-chambers in the old dwelling-houses to which they had previously accustomed themselves. After reading the temperate evidence of Sir Gilbert before the parliamentary committee, we are strongly inclined to believe that these expressions of dissatisfaction on the part of the officials may be attributed rather to an unwillingness to change old habits than to any innate defects of design, and that the buildings are a good deal better than the occupants deserve. But however this may be, it is in evidence that the English government goes farther than ours in its uncivilized distrust of the profession, and prefers to have no architect at all. Our government is indifferent to art; theirs seems to hate it. As regards the relations between the French government and its public buildings, as contrasted with those of the English, we refer our readers to another article from the *Builder*, which we venture to reprint in this number of our journal.

THE DOME OF ST. PETER'S. — II.

ITS PRESENT CONDITION.

IT is not easy to get from the information at our hand a precise and clear account of what has been done from time to time to strengthen the dome of St. Peter's by iron bands and armatures. The writer in the *Zodtchy*, to whose article we referred in our last number, cites the indications which are to be seen on the model of the dome attributed to Michael Angelo, where marks are to be found that imply vertical bars through the height of each buttress, connected by two or three horizontal chains around the drum. He quotes also from a Russian work, the author unknown, which was printed in 1776, and contains information translated from a "*Voyage d'un Français en Italie en* 1765 *et* 1766," published at Iverdun. The author says: "In order to consolidate as much as possible all the parts of the cupola, it was girt about at this time [the time of its building ?] with strong bands of iron, one of which was laid in the interior of the wall, and the other surrounded only the interior dome, at about a third of its height. A quantity of iron was likewise employed for the anchoring of the vaulting. M. Rocca computes this quantity at 20,000 marcs. The Marquis of Poleni thinks that this was done merely for the sake of embracing and tying the first round basement [the first counting from above apparently, where, however, such assistance was least necessary], forming an opening at the top of the inner dome; and that he has seen a part of this iron with his own eyes, through openings ranged around the upper part of this interior dome, and close to the outer one, by help of the surrounding wall which forms the tambour of the lantern." And again: "According to the third book of the historic memoirs of the

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Marquis of Poleni, several cracks were noticed in the dome in 1680, but no heed was paid to them till the accession of Pope Lambert.[1] Then first it was remarked that there were serious fissures in the dome, the drum, and the buttresses, which must be the result of insufficient connection between the buttresses and the drum. Architects and mathematicians were called into counsel, who, in a unanimous report, which was rendered on March 9, 1743, declared it indispensable to strengthen the drum and dome by bands of iron. Five of these were applied in 1743 and 1744, distributed from the pedestals of the buttresses to the base of the lantern. Moreover, it was found in 1747, that the former iron band, laid around the inner dome as long ago as in the time of Sixtus V., had burst, which made it necessary to mend it. A new one was laid besides, on the outside dome, just under the first windows [dormers], and over against the broken band of the inner dome. According to the memoirs of the Marquis of Poleni, these repairs were made in 1748, and the six bands consumed more than a hundred thousand pounds of iron."

Of these various bands and armatures the Russian observers detected four: two external bands at the levels of the first and second interior galleries; an interior armature or girdle around the base of the inner dome, a foot above the floor of the interior corridor, as we may call it, which is formed between the two shells where they first separate, by piercing the meridian arcs or webs which connect them; and another lower down, bedded in the masonry of the attic on which the dome rests, at about seven feet above the main cornice of the drum. This last was indicated only by the projection from the masonry of its cramps and anchors; that between the shells of the dome was of iron bars linked together and keyed in the way shown in our illustration.

Examination of the masonry showed that almost every part of the structure was more or less cracked and dislocated. The amount of deterioration shown by a careful scrutiny will be almost incredible to those who have viewed the dome even from its own level only with the eye of a traveller or of an artist. There were horizontal cracks in the wall of the stylobate itself, and the walls of the drum were, says the paper in the *Zodtchy*, "furrowed with a multitude of rifts." These rifts are seen in the solid belt of the drum below the windows; but are more numerous and larger above, especially in the window-heads, which show cracks of not less than a quarter of an inch in most of the piers. The buttresses appear to have suffered on the whole even more than the piers to which they are attached, some of the fissures, which increase upwards, being not less than an inch wide at the tops. It was noticed, however, that three successive buttresses on the south-west quarter of the dome were entirely uninjured. (Our readers will remember that St. Peters, like most of the Cisalpine churches, is unoriented, and that it fronts towards the east.)

It was observed that in general, not only were the upper parts of the drum and its supports more fissured than the lower, but the cracks, which had from time to time been pointed with cement, had constantly increased and re-opened. An ingenious system had been in use for indicating the changes that occurred. Marble tablets of dovetail shape had been set here and there across the cracks, and bedded in the masonry. The tablets were about five by twelve inches, and three-quarters of an inch thick. There were great numbers of them, marked with the dates of their insertion, which ranged from 1819 to 1871, and so furnishing a sort of history of the progress of the deterioration during those years. In almost all cases, the tablets had either been broken or torn from their matrixes by the widening of the fissures. The rifts in the buttresses, approximately vertical, inclined inward toward the top, running diagonally downward therefore from the cornice of the drum to the outer edge of the buttress at its base, as is indicated by the drawing of one of the buttresses in our illustrations. Another fact noticed was that the fissures were continuous, not following the joints of the masonry, but passing indifferently through the stones and the joints. This fact testifies at once to the quality of the masonry and to the enormous pressure upon it, while it does not encourage the theory of the book above cited, that the dislocation was caused by "insufficient connection between the buttresses and the drum."

The inferences which were suggested to the examiners by the nature and direction of the fissures in the masonry were two: either that the drum, having the direct weight of the dome to carry, had settled more than the buttresses, and split away from them, or that the buttresses had been forced outward at the top by the thrust and spreading of the dome, and so split away from it. The first supposition, we are told, was set aside for want of evidence (perhaps too hastily); and the examiners, turning to the test of the plumb-line, found that the three buttresses, adjacent ones, which they plumbed, did in fact overhang from an inch to an inch and a half in their whole height, a deviation, however, which in a height of fifty feet is certainly not extreme. An elaborate computation of the weight and thrust of the dome was made, on the other hand, and indicated a moment of rotation about the heel of the buttress of 1,060,547 pounds, due to the resultant pressure of the dome, and a resisting moment of the buttresses equal to 1,470,024 pounds; so that according to this computation, the stability of the dome seemed secure.

It is safer to refrain from comment till we hear the conclusions of the Russian commission, which is deferred to a later article in the *Zodtchy*. We must notice, however, that the examination by the plumb-line was confined to the three adjacent buttresses which were sheltered from the wind when the observation was made; that there is no record of a levelling of the stylobate, which we should have thought an essential element in the inquiry, nor of the examination of any cracks in the dome itself, though these must have occurred and opened if it had continued to spread after the armatures were applied. The questions with which the writer of the interesting article in the *Zodtchy* closes, and to which he proposes to return, are: How to explain the fact which is asserted, that the dislocation of the cupola was not immediate, but began nearly a hundred years after the building was finished? How account for the buttresses being so unequally injured, and for three of them remaining unharmed to this day? Are the precautions which have been taken sufficient? and if not, what shall be done?

[1] Benedict XIV., 1740-58.

THE REGULATION AND QUALITY OF THE SUPPLY OF FRESH AIR IN VENTILATION.

Paper read at the meeting of the Social Science Association at Saratoga, Sept. 6, 1877, by Frederic Tudor of Boston.

IN determining the quantity of air to be supplied to and removed from a building, and adjusting the corresponding capacity of the air-shafts, it is customary to assume standard temperatures of the air inside of the building, and of that outside which must be heated before distribution. The latter is taken as the average winter temperature. The height of the building and of the exhaust shaft being known, it is easy to calculate the approximate sizes of the air-ducts required for the supply and removal of a required quantity of air in a certain time: say in cubic feet per minute. But the great range of temperature in our climate, often touching extremes as far as 50° Fah. apart within twenty-four hours, is a sufficient reason for not adopting any such rule, without taking extraordinary precautions. Supposing the flow of air in the shafts on a mild day to be represented by the number 25, the relative flow on a cold day would be 30. Economical considerations require that it should be just the reverse, since more fuel is required, first, to heat the extremely cold air; and second, to heat the increased quantity: which involves a waste amounting to 17 per cent. Then the natural ventilation of the building — that which takes place through its cellar, walls, windows, doors, and roof, which is not taken into account in a scheme of ventilation — is materially increased in cold weather, and a large amount of heat must be expended to meet it. But the greatest obstacle of all is the prevalence of high winds which accompany, or rather bring on, a low temperature.

The force which determines the movement of air in shafts is a very small quantity, being only the difference between the weights of a column of air as high as the exhaust shaft, having the temperature of the outflowing air, and of a similar column having the external temperature. This force is, in most cases, less than one-hundredth of that of a strong north-west wind.

To counteract the effects of temperature and wind, supposing that there is no force employed except that obtained by heating the foul air in the exhaust shaft, the most careful study and judgment will need to be used in locating the fresh air openings, proportioning and arranging the flues, and in regulating the exhaust. Valves in the inlet shafts are usually employed; and since appliances to regulate the flow of air under varying conditions must be adopted, it is important that they should be few in number and simple in arrangement. The occupants will be fortunate if the ventilating apparatus of their building receives intelligent and faithful superintendence; and since the design is likely to be defective, and its working vexatious to the best-meaning manager,

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there is no sense in blaming him for relying upon his own judgment, and securing what seem to him the best general results. Let there be but one inlet, with a valve to regulate the supply, and a pressure meter to show at a glance the volume admitted per minute; one heating chamber, with an arrangement for adjusting the temperature of the warmed air, — an indispensable but never-seen appliance; with a thermometer to show the temperature, and a valve in the only outlet shaft, operated from the same point as that in the inlet. With this arrangement only three simple operations are required to regulate the quantity of air and its temperature, and the results of all are immediately manifest. If a mistake is made, it can be instantly corrected, without waiting for complaints from the suffering occupants above, since the engineer sees exactly what he is doing. If he once finds that he can easily make any required change, his interest and gratification are increased, and he will take a pride in the certainty with which he can secure exactness.

The disposition of details in ventilating work must be directed by experience alone. The books on the subject, so far as they give us history and examples, are valuable; but even these are defective, since they seldom give well-observed facts and results. As to the purely theoretical works, they are of no practical value whatever. The formulas which they give are deduced from limited data, derived from the simplest cases. The higher mathematics cannot deal with quantities made up of a large number of variables; and a scheme of ventilation is entirely composed of varying conditions, variously connected and growing out of each other. Mathematical and physical research do give valuable data for use in ventilation, but they do not teach the art, nor do they throw much light upon the more complicated details which are the chief embarrassment of the work. The art of ventilation must be learned like any other art or trade, by practice combined with instruction; and expertness can be acquired by those only who are close observers, who have a certain intuitive judgment, and who have taken time to devote themselves to a thorough practical investigation of the subject.

Much care must be taken to avoid impairing the quality of the supplied fresh air in the process of warming it. The natural purity of the fresh air may be diminished by contact with red-hot surfaces of iron, which will extract a portion of its oxygen, — especially the oxygen which is united with hydrogen in the form of invisible vapor, — whereby the degree of humidity is reduced, and hydrogen set free in the air; which will charge it with the unpleasant gases given off by dust and dirt which have been carried into the heating apparatus from the street, when heated to a high temperature, or by leakage of the products of combustion from the heating apparatus. The healthfulness of the air may be still further reduced by neglecting to add to the amount of its vapor while increasing its temperature. All these evils have been found to exist where furnaces of cast iron are used; and, without considering whether they might be owing to defects of construction, it has been hastily assumed that the material — cast-iron — was the cause of them all. The partial investigations of MM. Deville and Troost, undertaken at the instance of Gen. Morin, have been accepted as finally condemnatory of cast iron as a material for stoves and furnaces. They in reality only prove that the apparatus with which they experimented was imperfect in construction, as might be expected in a stove of the cheapest possible character. The competition to sell merchandise, and to buy the cheapest offered, has resulted in the gradual elimination of all qualities of excellence in warming apparatus. As to the diffusion of the poisonous gas — carbonic oxide — through the imaginary pores of cast iron, it amounts to nothing, and can scarcely be detected with the most extreme care, even in air exposed to prolonged contact with the hot iron; but the free passage of this gas through the imperfect joints of the ordinary cheap furnace amounts to a great deal. And all the evils arising from over-heating will certainly be found when the heating surface has been so reduced as to make it necessary to keep it red-hot all the time. It is now generally thought that wrought-iron is a more suitable material for furnaces than cast-iron. This is true, but is no new discovery. The objection to it has always been the great cost of working it; and, in order to compete with cast-iron furnaces of good quality, the makers have been compelled to omit the best features, and admit defects which make them in every way inferior to an old-fashioned, honestly-built, cast-iron furnace. A good wrought-iron furnace cannot be cheap; its cost should be certainly double that of a cast-iron furnace of equal power. Since, then, the latter can be made to answer all requirements at a less cost, it would seem to be better adapted for general use.

But in any case, good results cannot be obtained from cheap and inferior apparatus. The tendency to cheapen every thing to the point where there is only an appearance of value, and only substance enough to enable the object to stand up until its sale is completed, will overpower and destroy the wrought-iron furnace in its turn. It is now about to bring discredit upon steam-apparatus, and it is extremely doubtful if there is a single case of heating by steam on a small scale, which could not be better done by a good furnace at half the cost. For small dwellings and schools, where economy must be taken into account, liberal expenditure for the best, but only the best, furnace work will be infinitely better than a cheap and half-complete steam-apparatus, constructed at nearly twice the cost. Lest these ideas should seem to be retrograde, let it be borne in mind that it is not the best that is sought for, but the best for the least money, which is a very different thing from the cheapest. In other words, a superior article of an inferior class is to be preferred to a poor article of a higher class, and it generally costs much less.

There is another way in which the quality of the air is dependent upon the heating-apparatus. It is the means whereby the relative humidity is kept up, or moisture added in proportion to the increased temperature of the air. All natural air contains among other constituents a portion of watery vapor. The amount is very variable, but increases rapidly from lower to higher temperatures. By agreement among chemists, the total amount which the atmosphere can hold at each degree of the thermometer is called saturation. At 32° Fah. it is 2 grains, and at 70° it is 8 grains per cubic foot. The excess above saturation is always manifest in the form of clouds, fog, dew, rain, or snow. The actual amount found at any time is compared with the amount required to saturate it at the same temperature, and is stated as so much per cent, and called the relative humidity. In the Northern States the average relative humidity is 70 per cent, in England 80 per cent. Now, if we take air at 30°, of 50 per cent relative humidity, and heat it to 70° without adding moisture as nature does, we shall have a warm air of only 12 per cent humidity. It is sufficient to say that no observation of natural air has ever been made which showed so low a degree of humidity. As far as the writer knows, the lowest relative humidity is found in spring on the eastern coast of Massachusetts, during the prevalence of the so-called damp east winds. So far from being damp are they, that they are the very driest known, showing sometimes as low as 30 per cent. They are, according to the writer's observation, always followed by epidemics of catarrhal troubles; are unspeakably disagreeable, and detested by everybody. North-west winds in the early spring, when the earth is partially covered by melting snow, often show the same character, and are mistaken for east winds by unobserving people. The cause of their dryness is to be found in the absorption from the atmosphere of its vapor by the exceedingly cold water of the Arctic current east of New England. It seems paradoxical that water should absorb moisture from the air, but it takes place precisely as frost is deposited on a cold window-pane. A melting block of ice placed in a dish, and balanced on a pair of scales in a warm atmosphere, will shortly weigh down the beam by aid of the weight of the moisture or dew precipitated upon it. In the same way the west wind, already comparatively dry, yields up its water to the masses of melting snow. The instinctive dread with which these winds are regarded is corroborative proof of the close connection of the low rate of humidity with many diseases of the breathing-organs, without ascertained facts showing them to be the cause. But since the characteristic of spring air is its dryness, and during that time such disorders are prevalent, it is safe to conclude that dryness is the cause, or at least an accomplice.

Such are the effects of a dry atmosphere at low temperatures, when the air although saturated holds but little water. What may be the effects of the dry air at the high temperature of our houses, which is relatively even dryer than the hated east wind, and which has five or six times the capacity for absorbing moisture from the lungs and skin which the colder natural air has? Perhaps the doctors can identify disorders, not febrile, but which could be explained by supposing the blood to have lost a portion of its water which in health is invariable in quantity. Would it be safe to hint that rheumatism and neuralgia might be some of these, and that there might be others, of a febrile nature with a specific cause, which owed their origin to the inability of the deranged blood to repair waste and fortify the system against attacks which healthy people in other climates are not subject to?

It was said before that the relative humidity was variable even in natural air. In fact, it varies from hour to hour, but in pleasant climates it seldom falls below 65 per cent, and the more limited the range the more agreeable the climate. Increased ventilation means diminished humidity, since there are many unrecognized sources of moisture in every house, and if the air is frequently changed, of course these are less able to keep up the supply. In most well-ventilated furnace-heated houses, the humidity will not rise above 30 per cent in cold weather, while in buildings heated by steam or hot water, on the indirect system, the amount will generally be below 20 per cent, sometimes at 15.

It is important to avoid all schemes of ventilation which provide for the admission of unwarmed air through windows or wall-openings. It is next to impossible to so arrange the distribution as to avoid draughts, which will certainly lead to the permanent closing and neglect of all such openings. The more draughts there are, or the more rapid the movement of air in schoolrooms and halls, the higher should be the temperature and the relative humidity. All the sting is taken out of a draught, if it is warm and unable to chill the body by absorbing the insensible perspiration too rapidly, as it cannot do if near the point of saturation. But if the distribution is well managed it is safe to introduce air as low as 65°. Any plan of ventilation which involves a multiplicity and complication of details will be certain to fail, either from

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ignorance of its construction and purpose, or from neglect and indifference to results. Finally, the requisites of a successful scheme are, the reduction of the number of parts, control of the movement of air at one point by one operation, regulation of temperature without interfering with the quantity of air supplie, accessibility to all parts so that they can be cleaned or repaired without trouble, all the unavoidable mechanical movements to be as simple and self-evident as they can be made, and suitable apparatus for the evaporation of water to be included. It is safest that the entire plan of the heating and ventilating should be decided upon and incorporated into the general plans of a building, before the first step is taken towards its construction.

THE ILLUSTRATIONS.

TOWER AND LANTERN, ST. GILES'S CATHEDRAL, EDINBURGH.

THE accompanying illustration which we take from the *Building News* of Sept. 7 makes its appearance just in time to illustrate the remarks we made last week when comparing the skeleton frame of the dome of St. Peter's with the crown-topped Scotch towers.

"The Church of St. Giles dates as far back as the beginning of the twelfth century, since which period it has undergone numerous additions and alterations, so much so that its earlier characteristics have entirely disappeared. The date of erection of the lantern is not quite certain, but it is supposed to have been about the middle of the fifteenth century, at which time the roof of the old church was raised, and a clerestory added. In 1571 the church was forcibly taken possession of by Sir William Kirkaldy of Grange (in the interest of Mary, Queen of Scots), who placed in the steeple 'thre pieces of brasin ordinance' with which to assist in holding the city against Regent Murray's forces. It was not till 1633 that Charles I. caused St. Giles's to be constituted a 'cathedral church, according to the first intention of the erectors and founders thairof.' In 1648, owing to the dangerous and ruinous state of the lantern, the magistrates had it thoroughly repaired; and it is probable that at this time the uppermost portion was rebuilt. Again, in 1829, the whole cathedral was restored and refaced in a style of Gothic possessing no architectural interest whatever, that portion embodied in the subject of illustration being the only part left in its entirety. This species of lantern seems to be peculiar to North Britain, as it does not occur farther south than Newcastle, while we find specimens of it still remaining at the Iron Steeple, Glasgow, and King's College, Aberdeen; and until recently it terminated the towers of Linlithgow and Haddington churches. Of all the Scottish examples, that of St. Giles's is the richest and lightest, being of an octagonal character, the others being merely formed by ribs springing from each of the four corners of the tower. The cathedral stands on a high ridge of land running westward, and terminating with the Castle Rock; and from its elevated position the tower may be seen from almost any part of the city, forming a pleasing and picturesque feature in the view."

THE QUEEN'S INSURANCE COMPANY'S BUILDING, NEW YORK, N.Y. MESSRS. CLINTON AND PIRSSON, ARCHITECTS.

(56 Wall Street, New York, N.Y.)

This building covers a portion of the well-known Jauncey-court plat on Wall Street, New York. It measures 30 by 100 feet. The design is modified Victorian Gothic; the basement story is in light granite, with pillars and lintels. At the first floor the design becomes more elaborate. The entrance-door has a segmental arch, with voussoirs alternately of the ordinary brown stone and Wyoming blue stone. This last is at present rather a novelty, but its excellence must bring it into general use. On the recessed tympanum a medallion bust in blue stone of the Queen of Great Britain will be cut. The shafts on either side the door, as throughout the front, are in polished granite. The voussoirs over the great first floor window are all of blue stone, the variation being in the working of the face. The tympanum here is of red granite with polished face. The upper stories are in blue stone and red brick, with a belt course in red and black brick, below the fourth-story window-sills. The entrance-section is carried up and emphasized as a tower by a relief of 8 inches. Up to the main cornice the height will be 74 feet; to the tower-cornice, 88 feet; and to the top over all, 110 feet. The construction will be fire-proof, with iron beams, brick filling, etc. The plan is a simple one, with stairways and elevator grouped in the centre. The finish of the first floor will be in mahogany. The upper floors will be finished in ash. The whole building is to cost, complete, about $125,000.

THE DOME OF ST. PETER'S.

See leading article.

DIAGRAMS SHOWING THE CONSTRUCTION OF THE SEATS IN BLACKSTONE SQUARE, BOSTON.

See article on this subject.

DESIGN FOR A COUNTRY HOUSE. MR. F. M. WHITEHOUSE, ARCHITECT.

(36 Clark St., Chicago, Ill.)

CORRESPONDENCE.

COURT HOUSE BRICKS. — POLISHED GRANITE. — THE NEW CITY HALL TO BE COMMENCED. — THE EASTERN INSANE ASYLUM. — AN ARCHITECT APPOINTED WITHOUT COMPETITION. — THE INDIANA STATE HOUSE AGAIN.

CHICAGO, September.

THE difficulty in establishing a standard for determining what constitutes a good common brick has had a practical illustration during the last few days. Our new County Court House, occupying the east half of the Court House Square, has now reached the level for the second story beams, though some parts of the stone-work are not yet set. The contractor had agreed to furnish "good, sound, hard-burned bricks, free from lime and cracks." He had hardly commenced work when members of the building committee induced the architect to order the contractor to furnish "sewer brick," or such as would pass inspection in the Department of Public Works, for the first story. The architect does not seem to have had any authoritative directions from the building committee, but nevertheless he gave the order, and committed the county to the change. As soon as the second story was reached, the architect recommended to the board, and the committee approved the recommendation, that the contractor be directed to use "sewer brick" for the second story walls, and be allowed $3 per thousand extra. A strong opposition immediately arose, and the matter is not yet settled.

It is contended by some that the specifications from which I have quoted above called for as good as sewer brick, and that the architect had neither reason nor right in ordering the change which he now seeks to have carried out in the remainder of the building. This illustrates what I said before, that the only name for good bricks here is "sewer bricks." The want of a common understanding of what description can be given to define a first-class brick, has been taken advantage of to saddle a large "extra" upon the county. The price demanded for the difference, if difference there be, between the bricks specified and "sewer bricks," seems extravagant, for the Department of Public Works has always been able to procure all the "sewer bricks" it wanted for an advance of $1 to $1.25 over regular prices. The government pays $1.50 more than ruling prices, and gets the best selected bricks, superior, if possible, to those used by the city in public works.

The result of this discussion, which has now been taken up by the local papers, cannot fail to be of benefit to the public. It will induce architects to be more careful in specifying and inspecting brick-work, and bring the builders to a better understanding of the specifications they work under. It can only affect the brick-makers through the pressure that may be brought upon them by the contractors, forced to the fulfilment of their contracts by the architects. Meanwhile, for a time we will be deluged with the "culls" left over after the "sewer bricks" have been selected out, and architects will have to keep a sharp lookout lest they be introduced into building work. There is nothing that will bring brick-makers to their senses sooner than a good stock on hand of unsalable "culls."

The polished granite for the Court House is now being set. All the stone-work about the entrances and public halls which can be touched by human hands will be of this material. The building has been somewhat delayed on account of the late day at which the granite was ordered.

Meanwhile, during the wrangles of the Court House Building Committee, the contractors, and the architect, the City Hall on the opposite side of the square bids fair soon to be under way; the Law Department having decided that the City Hall Fund, amounting to over $600,000, though it had been used to make good other funds which had been appropriated unlawfully by the late city treasurer, Gage, was still intact; in other words, that the city was bound to make it good out of any moneys on hand. This decision enabled the aldermen to clearly see how the building could be commenced. On the 3d of this month, they passed the following short but comprehensive ordinance: —

"SECTION 1. That the Department of Public Works, in connection with the building committee of this Council, be and they are hereby authorized and empowered to take immediate measures to put in the foundations of the City Hall building upon its original site; and according to such plans and specifications and in such manner as they, or a majority of them, may decide upon; and to employ such help, and let such contracts in carrying on said work, as may seem proper and advisable, as provided by law.

SECT. 2. This ordinance shall take effect, and be in force, from and after its passage."

This delegated the whole matter to the Department of Works (of which the mayor is the sole member) and the building committee of the council. The building committee has an old architect at its head, and several ex-builders in its number, after the manner of many other similar bodies. The Department of Works is by the general law obliged to make all contracts for, and take charge of, all public buildings. It employs an architect on a salary, not as an officer, but rather as an employee. He makes the drawings for all buildings erected by the city. The gentleman at present employed is a Mr. Artinstall. The Superintendent of Buildings is independent of the Department of Works, but it is understood that he will have supervisory powers in connection with

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the new building. The present incumbent is Mr. L. D. Cleaveland, an architect of high standing.

Long before any of the proceedings just mentioned took place, the city entered into an agreement with the county to erect a building uniform with that of the county in exterior design, whenever it should be able to proceed with the work. This practically adopted Mr. Egan's design without specifically employing him as architect.

The building committee and the mayor have already held several conferences, some of which were secret, and some open. With a rather injudicious haste, they first decided to build without the use of piles under any part of the building, and to rest the entire building on a base course of concrete 3 feet thick, and of sufficient width to give a uniform bearing to the superstructure. This is directly contrary to the course taken with the county part, which is being erected on piles driven about 30 feet deep.

The committee then made a written contract with Mr. Egan, architect of the county's building, whereby in consideration of $3,000, he is to sell copies of every drawing made by him for the exterior of the county building. Mr. Egan is not, however, employed as architect, and I presume assumes no responsibilities so far as the City Hall is concerned. The city thus has the plans for a shell, and will have to provide an interior arrangement to suit it, and adapted to the wants of the city government. It is understood that overtures will be made to Mr. Egan for the copy of a plan which he once made for the interior arrangement for the city's building, which was prepared with great care, and after consultation with the city officers. With this the Department of Works will have all the drawings for the exterior, and a general plan of the interior, supposing it to be satisfactory. Further architectural work than this, it is contemplated, — though not positively determined, — will be done by employees of the department, subject to the approval of the building committee of the council. The superintendent of buildings will be consulting architect and superintendent in his official capacity.

Thus it will be seen that we are to have a $2,000,000 building *without an architect*, though the credit of the main design will be with Mr. Egan. The city authorities are determined to exercise the greatest economy in the prosecution of the work. The two buildings, as to their exterior, will be twins. In interior work they will be about of equal value. It remains now to be seen which will be the most costly.

There was recently a great "scramble" — it cannot be called a competition — for the Eastern Insane Asylum to be erected at Kankakee in this State. Commissioners were appointed by the last Legislature, and $200,000 were appropriated for the commencement of the buildings. The act said that an architect should be employed at not exceeding two per cent commission, and that not more than $5 per day should be paid for superintendence. Last week the commissioners met in this city, and though no plans had ever been asked for, they were waited on by a score of architects, most of them with plans to offer. The commissioners, however, made a wise choice in employing Mr. James R. Willett of this city, as architect and superintendent. Mr. Willett had not made any plans.

Thus one more public building has been disposed of without an architectural competition. The course taken by the commissioners is some indication of the direction of public opinion of late in this section of the country. Intelligent and honest men in positions of trust are at last *beginning* to see that competitions among architects are a farce; that they generally lead to the employment of incompetent parties; and result in the erection of buildings, not only of little value artistically considered, but which, as experience has shown in several cases lately, are as apt to fall down as to stand up.

In Indiana the experts called in by the governor under the recent law have rejected all the old plans that had been submitted; and new designs have been called for under the remarkable provisions of the act. Only ninety days are allowed, so there will be a good opportunity to bring out more ready-made state house plans, which are now in abundance in the West.

THE GOVERNMENT AND THE PUBLIC BUILDINGS IN ENGLAND AND FRANCE.

THE story of the Government Offices, incidentally connected with the administration of public affairs in this country, affords a moral which reflects upon the character of a Constitution vaunted at home and envied abroad. That architecture ought to be a national appurtenance is unquestionable; that it should be a question of political party has been reserved for the edification of living men.

Nothing perhaps will astonish the inhabitants of the Canadian Empire, or of the Australian and Polynesian kingdoms, more than the discovery that about nineteen hundred years after the sacrifice of Julius Cæsar — a short time before the rise of the British Republic — the inhabitants of this island determined the form and character of their administrative palaces on a principle of political selection. If the advisers of the Queen, whose sway the British people then acknowledged, were politically "blue," the islanders erected tall towers, big buttresses and pointed pinnacles, steep roofs and lofty chimneys; if politically "buff," they dispensed altogether with roofs and chimney-shafts, put up columns instead of buttresses, and arched their doors or windows in a circular instead of a lancet form. When the "buff" political chiefs were victorious, the islanders copied their palaces from some built in Italy about three hundred years previously; if the "blue" chiefs were in power, the islanders altered the outsides of the same palaces to resemble some erected in Venice and France about six hundred years previously. The "New Zealander" will probably prove to his countrymen that all the civilization of Australia and Polynesia is directly due to the perpetual strife which existed between the "blues" and "buffs" of Britain. For ourselves, we can but say after a careful review of the circumstances relating to the erection of one block of four Public Offices between Parliament-street and St. James's Park, that the history of the last forty years — as far as her Majesty's works and buildings go — seems already fortuitously blurred in an antagonistic concourse of "blue" and "buff" atoms.

How so ungovernable a people as the Parisians manage their artistic difficulties, will, as we said last year,[1] astonish the First Commissioner and Mr. Mitford. The position of French professional architects employed by the State is as happily onerous as it is successfully complicated. We find, to quote our own words, young M. Duc (now one of the most distinguished men in the world of French art, and not to be confounded with M. Viollet-le-Duc) clerk of the works (*inspecteur des travaux*) under Alavoine, an architect employed at the beginning of the present century, to design a monument in commemoration of the destroyed Bastille; we find the late M. Espérandieu, clerk of the works under the late M. Vaudoyer, at the new cathedral of Marseilles, and that at a time when the former was erecting in the same city one of the finest modern buildings in France. During the greater part of the Second Empire the capital was divided into eight "*circonscriptions*" for the preservation and maintenance of public buildings; and at the head of each was a professional architect. Thus, in 1869, the *Colonne de Juillet*, which remained under the charge of its architect (M. Duc), was in the seventh "*circonscription*," of which M. Lefuel (then crown architect at the Tuileries) was the inspector-general; while the *Cour de Cassation* of M. Duc, and the *École des Beaux-Arts* of the late M. Duban, were both in the third "*circonscription*," of which M. Questel (then crown architect at the *Château de Versailles*) was the inspector-general. The system pursued in Paris of appointing two or more really trained architects to superintend the execution of a large public building, under the superior orders of a professional senior, whose death or resignation permits them to rise in grade or succeed to the chief direction, has been attended with results apparently admirable. It is, however, sometimes said in Paris, particularly by the "*vérificateurs*" and "*métreurs*," a class which responds to the London building-surveyor, that French architects are not "practical" men; but as we are wise enough not to quibble over the English terms of "architect" or "surveyor," so our architects may very well run the risk of being called "not practical," if they will but produce buildings in London equal to the *Cour de Cassation*, both in an æsthetic and a constructional point of view. The fact is, as we constantly repeat, Frenchmen, in spite of things moral and social, are ahead of their English neighbors in this particular by at least a hundred years. Their art academies are older by that period of time than any established in this country; and intuitive respect for the arts comes by inheritance. Nor is the last Republic less favorably disposed to cultivated architects than the Empire which preceded it. A decree of 1871 re-established a permanent "Service of Architecture," at the head of which were three inspectors-general, MM. Bailly, Davioud, and Magne, professional architects of tried and distinguished accomplishments. A slight modification of that decree was made in 1876; the artistic inspection of Paris was then divided between MM. Ballu and Davioud, the three seniors, MM. Duc, Bailly, and Magne, remaining in an honorary capacity.

The duties of inspectors-general in Paris are varied and comprehensive. They give opinions upon designs and estimates; they look after works in course of execution, as well as the "*comptabilité*" of the architects intrusted with such works. Their "overseeing" more particularly regards the choice of materials, the difference between estimate and outlay, the alterations made during the progress of the works, and such things. They are also expected to prepare, first, the programme of designs for new buildings,[2] and, if required, preliminary sketches for the same; and secondly, to inspect the works in the division to which each is attached. No official, no one man of artistic and æsthetic experience approaching that of either Duc, Bailly, Magne, Ballu, or Davioud is at present engaged to serve the British capital as those excellent architects serve the capital of France. Yet, to the good or bad organization of her Majesty's Office of Works, or to the absence of any organization at all, has been largely due the quality of the buildings, new and old, in which various Departments of State are extravagantly crowded or magnificently lost. The bickerings of

[1] See the *Builder* for 1876, p. 181: "Monsieur Duc and some of his colleagues."

[2] Sir Gilbert Scott has stated in evidence that, before planning some of the new buildings in Parliament Street, he spent weeks in going from office to office consulting every head of department as to his own accommodation. "I endeavored," said he, "to carry out his wishes, whether right or wrong."

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officials have encouraged the blunders and concealed the cost of office. The Lords of the Treasury have squabbled with successive First Commissioners; Mr. James Wilson sparred with Sir Benja. Hall, Mr. Ayrton sparred with Mr. Layard, Mr. Lowe absolutely quarrelled with Mr. Ayrton; while a free fight of Departments preceded the fall of Mr. Gladstone and the dispersion for a time of the Liberal party. — *The Builder.*

THE BLACKSTONE SQUARE DISASTER.

BOSTON, 25th Sept., 1877.

DURING the past week the public mind has been agitated by the fall on Monday, the 17th inst., of the staging or stand erected upon Blackstone Square by direction of the committee upon the dedication of the Soldiers' Monument.

This fallen staging on Blackstone Square, and also the one still standing on Franklin Square, have been visited by members of the Boston Society of Civil Engineers; careful measurements and examinations have been made, and drawings of the same were presented and discussed at the regular meeting of the Society on Wednesday last.

A consideration of this topic from a purely engineering standpoint, will, it is thought, be of interest to the readers of the *American Architect*, and is here presented. We will simply try to learn whether the fall resulted from faulty design or faulty execution, leaving to others the placing of the responsibility for the faults. The accompanying isometrical sketch will give a fair idea of the arrangement of parts of one of the horses or bents supporting the seats, which horses were placed about 6′ apart throughout the length of the structure. They were placed in an upright position, and connected with each other by the planks forming the seats, and by a single horizontal strip of board, 6″ x 1″, about 2½′ from the ground, extending the length of the staging, and attached to each horse by two nails. The nails used throughout the structure were 3½″ long, and therefore, when used to attach planks of 2″ thickness, could enter but 1½″ into the part to which the plank was attached. The load which such a structure should be capable of sustaining is, manifestly, its own weight and that of all the people who could get upon it. Leaving the former out of consideration as trivial, and assuming persons to be closely placed upon all the seats, occupying each 1½″ laterally, and having an average weight of 125 lbs., we shall have 4 x 4 x 125 = 2,000 lbs. *vertical* load upon *each horse* of the structure. An examination into the method of construction shows that the bearers, both horizontal and inclined, upon which the seats rest, are in all cases attached to the *right-hand side* of the posts, as viewed from the rear. Such a condition must necessarily create a tendency to topple over to the right, since a vertical plane through the centres of the bearers would pass to the right of the feet of the posts. That this tendency did exist, and was the cause of the fall, is indicated by the condition of the remains. The Blackstone Square stand fell toward the south. The Franklin Square stand, which faced this, remains, but *leans to the north* until the rear posts are nearly a foot out of the vertical, and until the front posts come in contact with, and obtain support from, the iron posts of the fence surrounding the square. The yielding was in both instances toward the right of the respective stands when viewed from the rear. The tendency being for each horse to rotate about its foot, the effect of the vertical load on each seat to produce a horizontal pressure would vary as the height of each seat from the ground, or its distance from the centre of rotation. We find that the average distance from a vertical of the bearings of the four seats is about 1½″, and the average height of the seats from the ground is about 69″. With these data we ascertain that the 2,000 lbs. vertical load upon each horse will create a horizontal strain upon the top of the same amounting to about 45 lbs., and tending to push it over, or cause rotation about its foot. This is the effect of the dead weight alone. Any movement of a crowd, sudden jar, or whatever else might cause a shock, would serve to intensify this tendency by giving motion to the mass.

What provision was made to resist this tendency? Along the back of the stands, about 2½′ from the ground, is a horizontal piece 1″ x 6″, attached in most instances by two nails, but in some cases by one only. The tendency in the case of rotation about the foot of a post is to twist these two nails off; and the ruins show this action to have taken place, the nails being bent sideways until they have broken off or their heads have pulled through the wood of the horizontal piece. In addition to this we have only the nails by which the seats are attached to the horses. The action upon these nails is precisely that of drawing with a claw hammer, — but in this case the handle of our hammer is 69″ long, while the claw is but 1″, or the 45 lbs. of horizontal pressure becomes resolved into 3,105 lbs. tending to *pull out ten nails each entering* 1½″. That is all!

Is there any wonder that the structure failed? No doubt the nailing was too slight for safety, but it was not in the nailing that the failure occurred; and as the nailing is very nearly uniform throughout, it is evident that this matter was not left to the individual caprice of the workmen employed, but was itself a part of the design. But even had the horses consisted of one solid piece, yet if the load had been applied as it was, and no provision made for lateral bracing to resist the horizontal strain tending to rotation, the result must have been the same. The conclusion is inevitable, — the fault was in the original design.

It has been alleged that in case of people being concentrated upon the upper seat, there was danger of the structure tilting over backward. We will examine into the strains tending to produce such action. The rear post inclines toward the front about 6″. Its foot is about 4″ across. The upper seat is set about 6″ back from the front face of the post, and its width is about 10″. Its centre is therefore but one inch outside the toe of the post. The maximum load on the upper seat would be the weight of four people, or 4 x 125 = 500 lbs. The weight of the portion of the stand below the upper seat is approximately 260 lbs., and this acts with a lever arm of about 4′ or 48″ to hold the front down. Resolving these two forces of 500 lbs. with a lever arm of 1″ and 260 lbs. with a lever arm of 48″, into their horizontal components, we find a tendency of 5½ lbs. to go over, resisted by more than 13,000 lbs. to remain quiescent. It would seem that no danger need be apprehended from the tendency of the stand to overturn backward under any load that could possibly be placed upon the upper seat. L. F. R.

SOME INTERESTING WORK OF REPARATION ON THE ABBEY ST. ALBAN'S.

THE work of moving masses of masonry or entire buildings by the application of jack-screws, hydraulic pressure, and other mechanical appliances, is more unusual in England than in this country. Operations of this nature which are familiar to us in the frequent process of raising grades and widening streets are considered in the old country almost incredible instances of hardihood; but in the reparation of St. Alban's Abbey under the charge of Sir Gilbert Scott, expedients not unlike our own and hardly inferior in ingenuity and boldness of contrivance are to be used. The manner in which this reparation is to be carried out is explained by the *Building News* as follows: —

"For some weeks past workmen have been busily engaged in excavating the floor of the nave, and around the bases of the great piers of the south arcade; these latter spaces have been filled with concrete as a preparatory measure to the erection of the ponderous trusses and shoring with which it is intended to lift off the roof. At the junction of the early English work of Abbot Trumpington with that of the Decorated of Abbots Hugh de Eversden and Richard Wallingford, the roof will be severed, and by means of powerful screws the western portion, about 120 feet long, lifted off the walls. The next proceeding, after centring all the arches with massive timbers, will be that of forcing the whole mass of Trumpington's work, the triforium and clerestory, with all its beautiful arcades, to an upright position. As this wall now leans over two feet four inches towards the south, and is upwards of 80 feet in height, some anxiety is manifested as to the success of the undertaking. Iron ties from north to south will be inserted in two tiers through the spandrels, with coupling screws in the middle, as were so successfully used in repairing the great central tower; the three tiers of raking shores already in position will be added to considerably; and four hydraulic rams will be used simultaneously with powerful screw-jacks and other mechanical appliances, to move the great mass. Raking shores will be applied inside the building at every vantage point; and two enormous horizontal trusses, the whole area of the section of the nave under repair, will be placed at the heights of 30 and 50 feet respectively, in order to regulate the distance to which the arcading is to be forced. Every precaution is being taken to render the bold undertaking a successful one. After the wall has assumed its upright position the roof will then be lowered on it in its proper place, and meanwhile four flying buttresses will be constructed to keep up the work so moved. These buttresses will be very massive, the abutments above ground projecting no less than nine feet from the south wall, with, of course, foundations far beyond. In excavating for the westernmost of these, the workmen have unearthed the foundations of one of the great western towers which was begun to be built by Abbot John de Cella, about A.D. 1209. The whole of the five western bays of the south aisle are to be groined as of old, the former groining having been destroyed, and the roof of this aisle is to assume its ancient high pitch. After these works are completed, the next section to undergo repair will be the four bays of the nave next eastward. The piers here of Hugh de Eversden, which were erected after the great fall of this portion of the abbey in 1323, show signs of weakness, being split vertically in many places. At present, as a precautionary measure, and with the view of preventing danger from any possible additional weight being thrown on them, it is intended to grip them with trussed balks, strongly bolted together."

THE DRESDEN THEATRE. — The theatre of Dresden, which replaces the structure on the banks of the Elbe, burned down some years ago to the regret of every lover of art, bids fair to rival the Paris Opera House in the magnificence of its decorations. The best artists of Germany are at work upon them. A colossal group by Schilling is to adorn the principal entrance, while eight groups, representing poetry, are to be placed along the side colonnades. Some of the statues rescued from the old theatre will find niches in the new.

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NOTES AND CLIPPINGS.

THE VENTILATION OF THE HALL OF REPRESENTATIVES. — The new ventilating and heating apparatus of the House hall has proved to be a great success. The new plan was introduced by Edward Clark, architect of the Capitol, in accordance with the report of the Board of United States officers, convened at the request of the Committee on Public Buildings in the last House, and for which an appropriation of $33,000 was made. The fresh air is now taken direct from the grounds of the Capitol through the terrace, and is tempered by the warm air in winter from the hot-water coils, while in summer it is thrown into the building direct from the grounds. A series of ventilators to carry off the foul air have taken the place of some ornamental pendants in the ceiling.

DEDICATION OF A MONUMENT. — The dedication of the new monument at Paoli, Penn., in commemoration of the fifty-three American soldiers under Gen. Anthony Wayne, who were killed by British troops under Gen. Gray one hundred years ago, took place Sept. 20. The monument is of Quincy granite, and bears the inscription, "Erected by citizens of Chester and Delaware Counties, Sept. 20, 1877, being the centennial anniversary of the Paoli massacre."

ELEVATOR ACCIDENT. — On Sept. 15, the packing of the second tube of the hydraulic elevator in the New-York post-office became loosened, and allowed the water to pour out into the lower story of the building. The safety apparatus prevented the fall of the elevator car.

MONUMENT. — A soldiers' monument was dedicated Sept. 14, at Dover, N.H.

EVENING DRAWING SCHOOLS. — The free evening drawing schools maintained by the city of Boston will begin their winter work on Oct. 1.

PHILADELPHIA FIRE STATISTICS. — A comparison of the fires which occurred in Philadelphia during the preceding two months and those of the corresponding months of 1876 shows that there is quite a decrease this year. In July, 1876, there were one hundred and twelve fires, the loss by which was $170,335.09, having an insurance of $1,243,324.61. In August there were sixty-seven fires, causing a loss of $49,423.39, upon which there was an insurance of $22,075. This year there were sixty-one fires in July, the loss being $25,435.45, and the insurance $310,450. During August there were forty-one fires, involving a loss of $6,935.85, upon which there was an insurance of $87,199.08.

THE ELECTRIC LIGHT TO BE TESTED IN AMERICAN CITIES. — A dynamo-electric machine, capable of producing not less than 1,200 candles' light, is to be purchased by the Franklin Institute of Philadelphia, which society will experiment with such machines as are offered to it for trial. This will afford an excellent opportunity to test the value of electrical lights, such as have been used in hotels and industrial works in France. The cost of the light as to running expenses and repairs, and its value in buildings containing machinery and large columns which will obstruct the light, are questions which a committee of the practical workers in the Franklin Institute will not fail to investigate.

BLOWING OFF STEAM. — A Mr. Shaw has invented a nozzle which will allow steam to blow off without making the usual deafening roar. It operates by breaking the waves of sound, the escaping steam being surrounded with a wire helix. A report adopted by the Committee on Science and Arts of the Franklin Institute says: "In view of the annoyance, fright, and danger arising from the roar of escaping steam, and of the completeness with which the nozzle destroys this roar, we are of the opinion that Mr. Shaw has done a great service to the community, and especially to the transportation interests, in overcoming an obnoxious and dangerous feature in the use of steam; and we recommend the award to him of the Scott legacy premium and medal for his spiral exhaust nozzle."

A MEMORIAL PAVEMENT. — The grounds surrounding the war monument at Berlin are to be paved with stones from the several battle-fields of the Franco-Prussian war.

FIRE IN DIEPPE. — The burning of a large portion of the town of Dieppe, France, on the 11th inst., shows that even French building laws are not perfect.

PRESENCE OF MIND. — Some repairs being in progress to the roof of a house in High Street, Barnstaple, says the *Builder*, a ladder fifty feet long was reared from the roadway. A mason's laborer named Charles Jones, when nearly at the top of the ladder, but not sufficiently so to deposit a heavy load of mortar on the roof, was observed by George Cross the mason, who was waiting to take the load from him, to suddenly stop and to be in a fainting condition. Cross immediately went down the ladder, and removed the load from the fainting man's shoulder on to the roof. He then descended to the assistance of Jones, whom he found in a fit ready to fall, but this he happily prevented by getting across him, and holding him tightly by hand and leg. Jones, in his fit, fixed his teeth in Cross's arm, and trembled violently as well as struggled to get free. For fifteen minutes the people below witnessed the struggle, afraid to ascend, until another brave fellow, named William Richards, a driver of a van, ran up the ladder to the assistance of the mason. In the mean time the fire-escape ladder was brought to the spot, and in the nick of time the police ascended; and the leather belt belonging to the escape being fastened round Jones, he was lowered, still in the fit, to the ground unhurt. The mason Cross was much exhausted, and when he regained the ground fainted.

ART AT HOME. — The Macmillans of London have in preparation, besides those already announced, the following volumes for their "Art at Home" series: "The Bedroom and Boudoir," by Lady Barker; "The Dining-Room," by Mrs. Loftie; and "The Drawing-Room," by Mrs. Orrinsmith. All these will be profusely illustrated and will be published in the course of the autumn.

A NEW MONOGRAPH. — Messrs. Virtue & Co., publishers, London, announce among new fine-art publications for 1878, "The Albert Memorial: its History and Description," by James Dafforne.

THE CANOSSA MONUMENT. — The Canossa monument, which was unveiled on Aug. 26, at Bismarckstein, at the highest peak of the Burgberg, near the village of Harzburg, is a granite obelisk, nearly fifty feet high, showing a bronze medallion of Prince Bismarck on the front, and on the opposite side the famous words: "*Nach Canossa gehen wir nicht.*" The Burgberg is the site of a castle which belonged to the German emperor who did go to Canossa. The director of the Harzburg mines, and Dr. Flotho of Jena, delivered addresses, when this defiant column was dedicated in the name of civil and religious liberty.

STATUES FOR THE FRENCH EXHIBITION. — Twenty-one statues, symbolical of the different countries exhibiting, are being prepared by several French sculptors of note. They are to form part of the decoration of the façade of the palace of the Champ-de-Mars.

ARTESIAN WELL. — Work is about to be resumed by the city upon the artesian well in the Place Hébert, Paris. It has already reached a depth of more than 2,200 feet without reaching a spring. The cost has been already more than $500,000.

THE WEST INDIA DOCKS. — The West India Docks, in the Isle of Dogs, formed in 1800 and 1802, cover 68 acres, and the buildings, etc., 72 acres. They cost $1,500,000, and hold 204 vessels. The shed near the quays is a quarter of a mile long, and the framework and supports are wholly iron. Beneath are extensive vaults for rum and spirits, wholly lighted by daylight reflectors and reflections.

QUICKLIME IN ARTIFICIAL STONE. — A Frenchman, M. Ducourneau, who had become convinced that the cracking of concrete blocks and artificial stones was due to the slacking of particles of quicklime contained in them in the same way that the bricks of Chicago are cracked, as was recently shown by our correspondent, has invented a process for neutralizing this action. With the mixture of hydraulic lime and broken stone, marble, sand, or flint, whichever substance may be used, is mixed a very fine silicious powder which has been treated with dilute azotic acid. This process has been employed with admirable results in the forts that have lately been built around Paris.

DAMP WALLS. — A correspondent of *La Semaine des Constructeurs*, who has been troubled by the condensation of moisture on the inner faces of stone or plastered walls of houses built near large forests or damp places, has overcome the difficulty by interposing between the air and the impermeable wall a permeable substance. This he effected by furring off upon the damp walls with laths, and nailing upon this furring a lining of stout linen. The wall-paper was pasted upon this; and the walls no longer reek with moisture.

FIRE ALARM. — The Watkins automatic fire-alarm apparatus is simple, and consists of a small copper tube about three inches long, called a thermostat, which contains a spiral strip of metal, so arranged that the expansion due to a rise of thirty degrees above the ordinary temperature of the room in which it is placed will close the connection between the two poles of a battery, and produce an electric current, which passing through a small iron box containing a clock-work and circuit-breaker, called a transmitter, at once strikes a bell and starts a register at the protective station, which gives the number of the building and the room in which the fire has broken out. The thermostats are placed at intervals of twenty-five feet throughout the building, and a transmitter in every room that requires a separate signal. This, with the connecting wires, is all that is necessary inside the building; the battery, recording instruments, etc., for the whole city being placed at the protective stations. If the main wires be disabled, either inside or outside of the building, notice is at once given at the protective station by a bell, which continues to ring till the trouble is remedied, alarms meanwhile being carried by the earth-circuit as accurately and promptly as if the wires were in perfect condition. This, we believe, has never before been accomplished, and can only be effected by the Watkins combined metallic and earth-circuit.

A CEMENT FOR IRON AND STONE. — It is customary to use melted lead to secure the jointing of iron with stone, and it is perhaps the best material for the purpose; but the cost of the metal has led to the introduction of several substitutes. Sulphur is often employed, though it is not very firm, and is always more or less destructive to the iron. A cement composed of a resin and powdered brick-dust has been found to answer in all respects, and can be recommended. It unites itself closely with the iron and stone, is insoluble in water, and causes no rust. The resin (either rosin and gum mastic, or pitch and shellac) is melted, and sufficient brick-dust added to give consistency, though not so much as to prevent its flowing readily when warmed; the addition of a few iron filings is an improvement. If the space to be filled is large, fragments of brick or stone can be wedged in before the cement is used. This cannot be done where lead is used.

SUICIDES. — During the last three years four hundred and fifty-three persons have met their death by jumping or falling from the high monuments and buildings of Paris.

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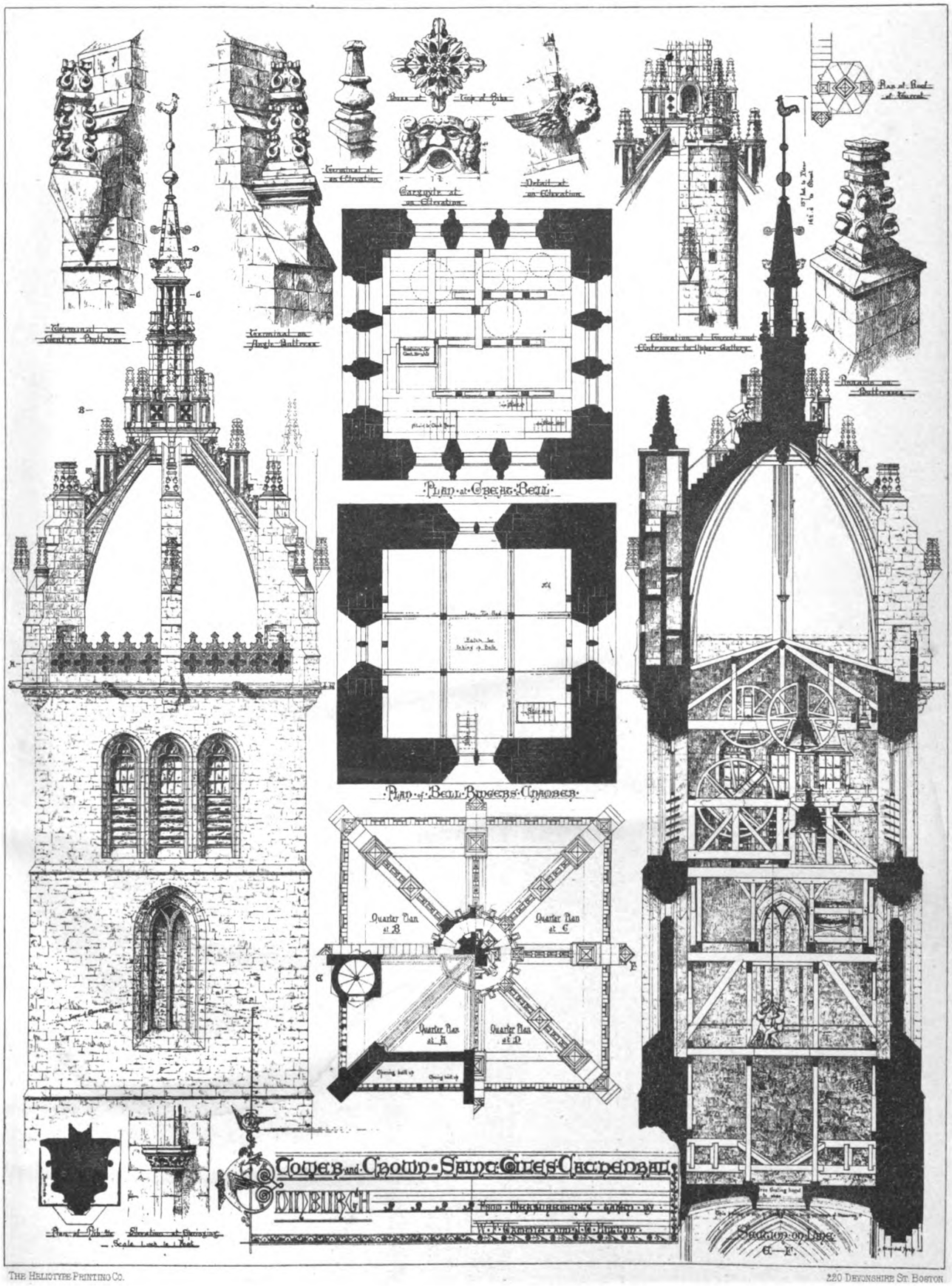

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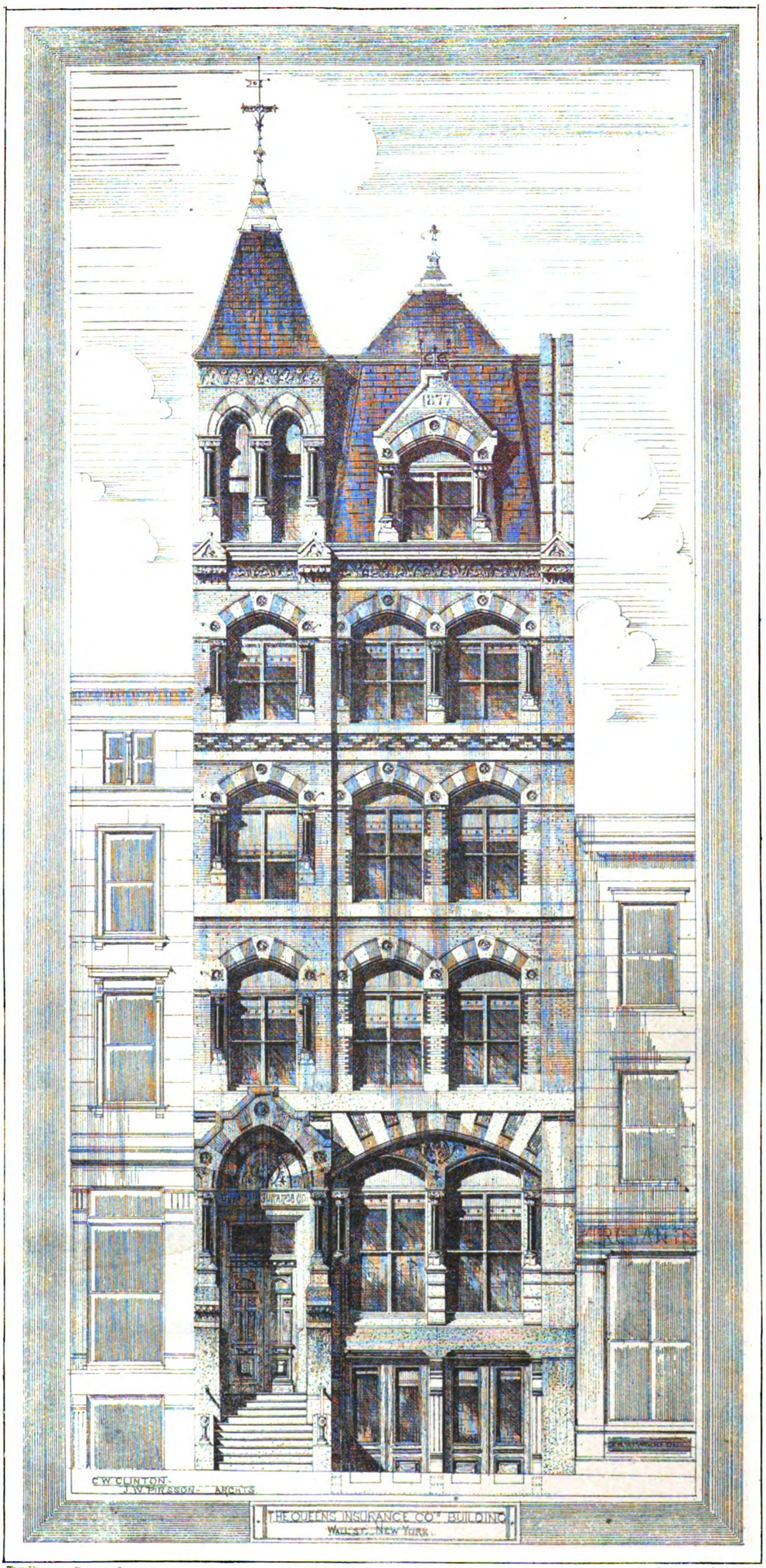

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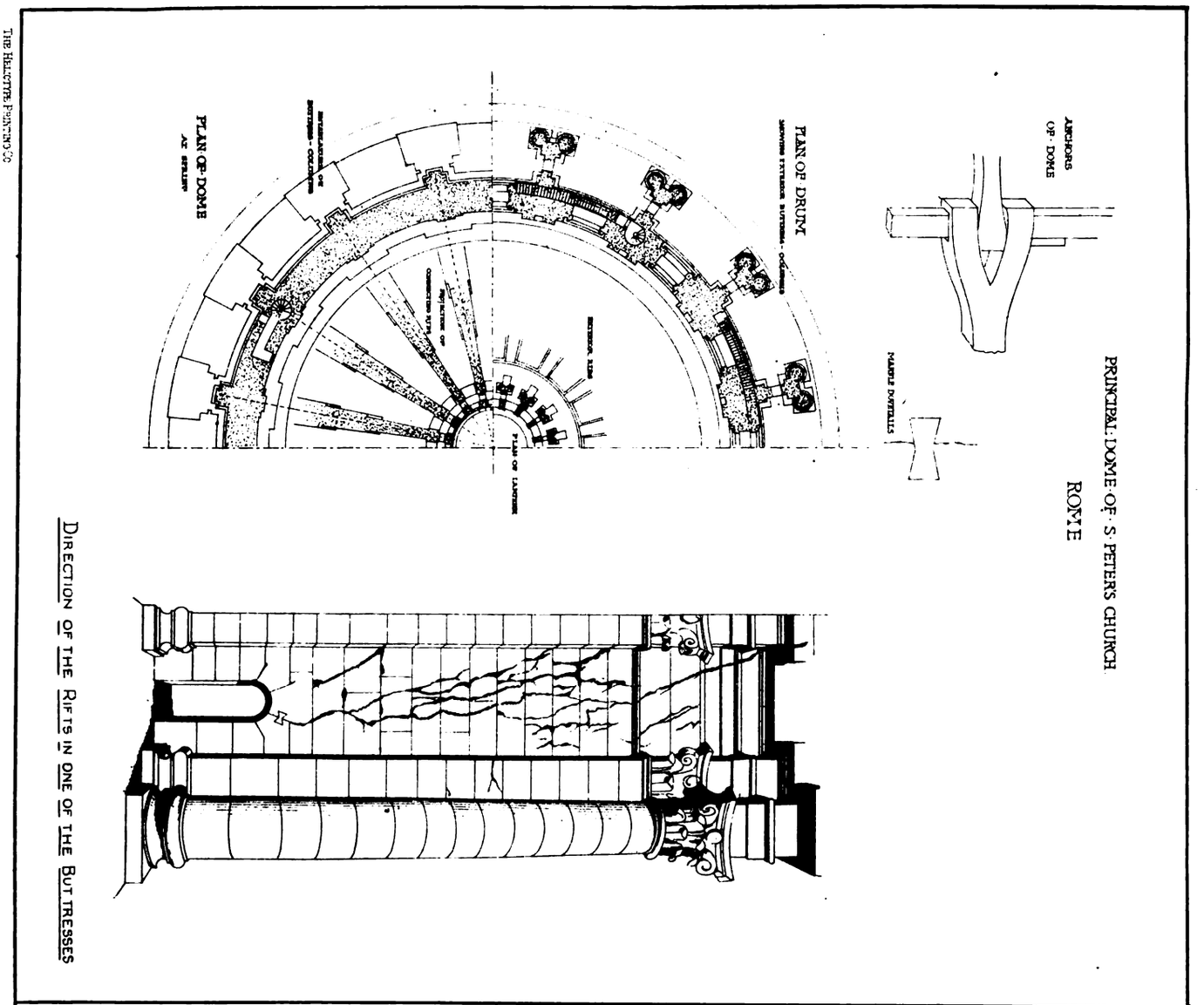

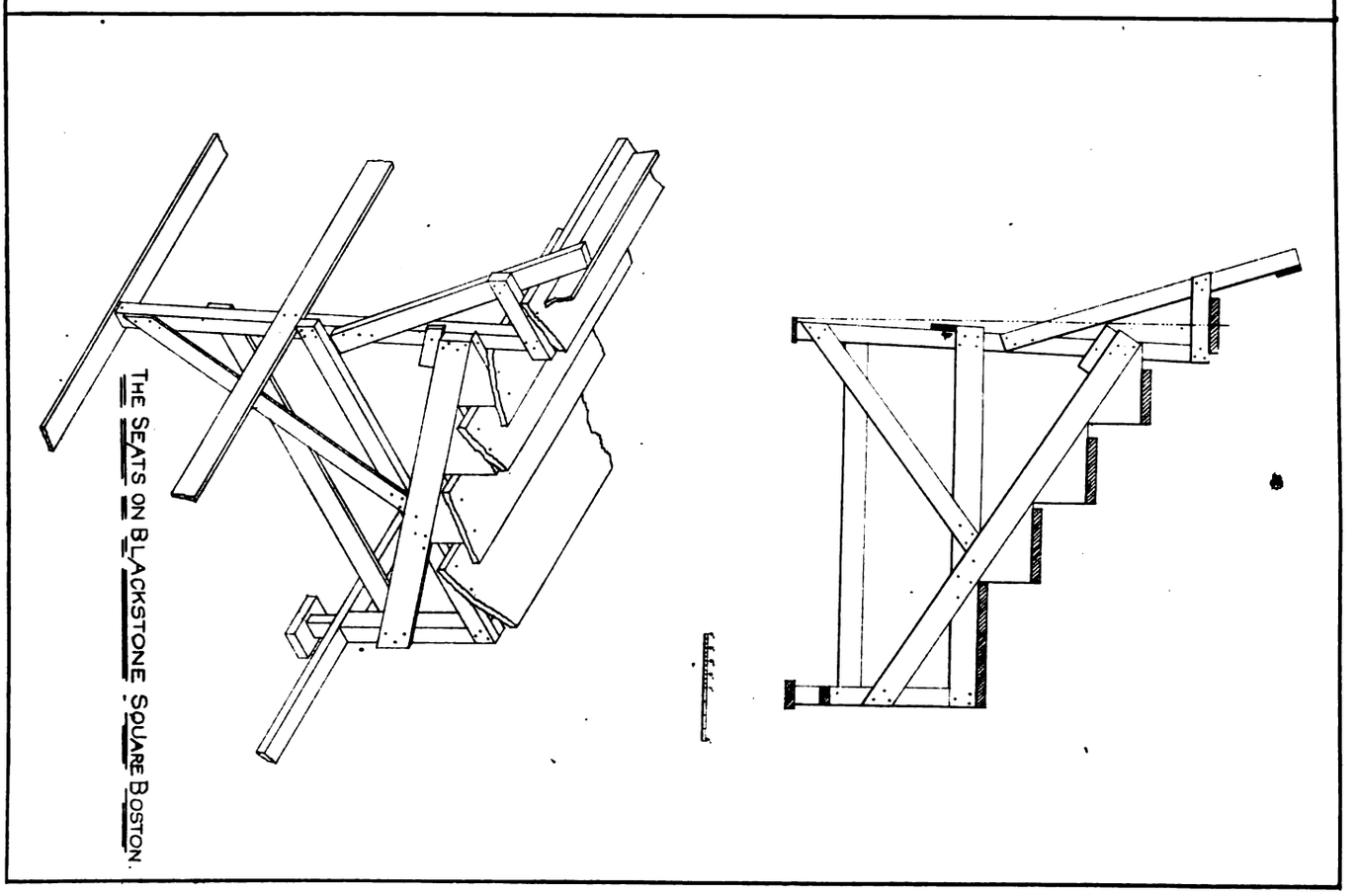

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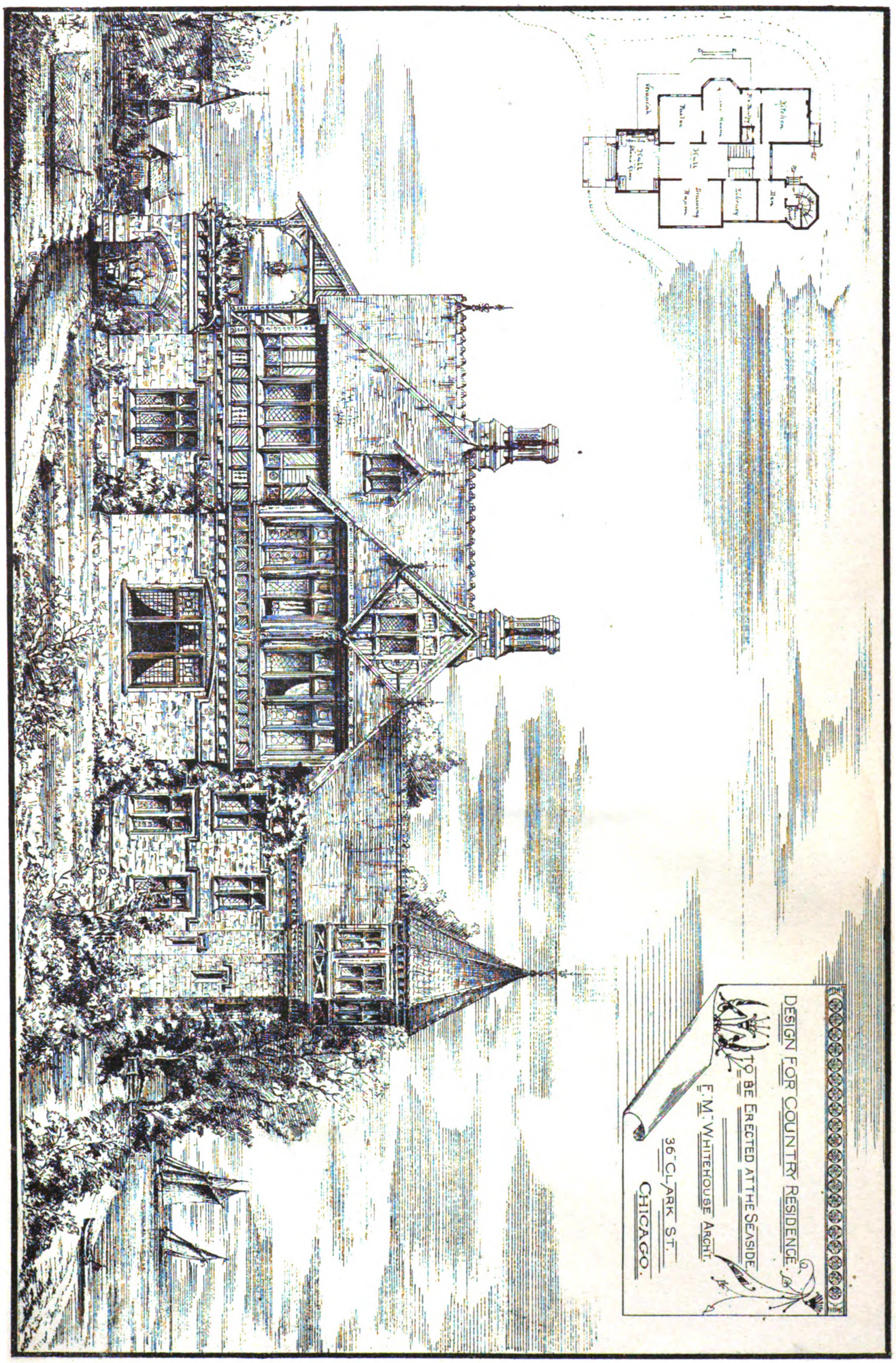

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, OCTOBER 6, 1877.

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THE injury of the Patent Office by fire has naturally aroused alarm on account of the condition of other department buildings at Washington, and the danger of great loss of the records of the government in case any of these buildings take fire. The President has appointed Col. Casey of the Engineer Corps, the Supervising Architect, Mr. Hill, and the architect of the Capitol Extension, Mr. Clark, a special committee to examine and report upon the condition of the buildings at Washington. The President's letter of instructions to the committee is as follows:

GENTLEMEN,—You are hereby appointed a commission to consider and report upon the condition of all public buildings in Washington, including those in process of construction or repair. You are instructed to proceed, without unnecessary delay, to make a personal and thorough examination of all said buildings, and to report as follows:—

First, The condition of each of said buildings as to security against fire, and whether any, and if any which of them, may be considered fire-proof.

Second, What, if any thing, can be done without further legislation to insure greater security against loss or damage by fire.

Third, What action by Congress, if any, should be recommended with a view to place the public records now in said buildings beyond danger of destruction by fire.

Fourth, To what extent said buildings, or any of them, are endangered by the character of their contents, and what can be done to remove this danger; and in this connection the Commission will consider whether danger results from the use of any portion of said buildings for branches of public service mechanical in their nature.

Fifth, What provision, if any, should be made for the custody and safety of files not in constant use.

Sixth, Such views and recommendations as may occur to you touching the general subject. (Signed)

R. B. HAYES.

BY all accounts there is room for anxiety; for in spite of the care and money that has been spent on the public buildings at Washington, there is perhaps not one, excepting the new State Department, that is completely guarded according to the standard of the present day. They are built of solid masonry, and with floors of brick, or iron and brick; but in most cases the roofs, built before all the latest precautions were adopted, have been slighted. The roofs of the newer wings of the Treasury are altogether incombustible, but that of the older part, especially of the east wing, is constructed more or less of wood, and can be burned. Those of the War and Navy Departments — old buildings, to be deserted when that which contains the new State Department and is to contain them shall be finished — are old-fashioned timber roofs as inflammable as could well be. The Post Office, built at about the same time as the extension of the Patent Office, is roofed in much the same way as that. The upper story is covered, to be sure, with a ceiling of brick arches on iron beams, and the Treasury Building is defended in the same way. But the garrets of every one of these buildings are crammed with old papers and records, the accumulation of years, for which there is no room below. It has been taken for granted that there was no danger of fire from within in these unfrequented recesses, and the danger is not great; but any construction that can burn is pretty sure to take fire in some way, sooner or later, and it would be almost impossible to save any thing from these garrets. The question will present itself, it is true, of what possible use for consultation can these neglected files be where they are; but still we do not wish them burned, nor the roofs that cover them. Fortunately the policy of the general government has not been niggardly in the construction of its buildings, and we may believe that there will be no backwardness in curing the faults that are now brought to mind, as fast as the convenience of the service allows.

WE have spoken from time to time of the singular warfare which English public men seem disposed to wage against architects. Mr. Ayrton, of happy memory, has long since disappeared from the Office of Public Works; but the opposition which was incarnate in him seems to inhere more or less in the general body of officials and legislators. We have heard Mr. Bentinck and Sir Edmund Beckett, and we have noted how Sir Gilbert Scott has just been pulled over the coals for the unsatisfactory planning of his new Foreign Offices. The *Architect* thinks that the dissatisfaction has reached a crisis, and that it would not be surprising if the government building were henceforth kept out of the hands of architects entirely. It repeats the statement made before a Parliamentary committee, which we quoted in our last number, that not one of the new buildings built in the last twenty years has been as convenient as its predecessor; and Mr. Mitford's testimony that the one new building which is satisfactory is the new Post Office in St. Martin's-le-Grand, built by the Office of Works without an architect. Mr. Mitford is further quoted as saying that if a new War Office or Admiralty were built, "it would be infinitely better built, and more satisfactory in every way, if it were built in the department, and if our own surveyors were to draw the plans." His reason for this opinion is that the surveyors are "thoroughly cognizant of all the requirements of the public departments," which of course implies the correlative that the architects are not conversant and do not make themselves so, and that this is the reason of their failure. The *Architect* adds, "It is a question whether the First Commissioner of Works in his place in Parliament may not be officially obliged to support the verdict of the working officers of his department. If he should do so, the whole weight of the government must follow."

THIS attitude of the officials is but one remove from that of Prof. Huxley in the recommendation of his honest bricklayer, and, making all allowance for the *esprit de corps* of a member of the Office of Works, is undoubtedly significant of a general feeling. The *Architect* regards it so, and is at a loss to say what is to be done if the feeling is pushed to the exclusion of architects from public work. This kind of distrust is one to which architects everywhere are more or less exposed; and besides the antagonism which may spring up between them and those who work under them, and the disposition of many people to side with these against them, there must be some reason for it. In the United States, where architects, if apparently in more esteem than in England, are much less so than in some other countries, such distrust exists, and comes to the front when accidents happen like those of the New York Post Office or the Rockford Court House, or failures in planning like that of the Capitol at Albany. It is not easy to say that if architects come to be shut out from public employment there is any thing for them to do but wait; but so long as they are given an opportunity to try again, the thing to be done is obviously to take a lesson from those who are thought to succeed better than they, and learn what is required of them. The requirements of domestic work are so generally understood, and the picturesque habit of domestic architecture lends itself so easily to them, that architects please their private clients and are consulted with confidence. But in great public buildings the requirements are intricate, and thoroughly well known only to the small class of people who use them; and the architect must go out of his way to get at them. The desire moreover, to give such buildings a dignified, formal, and what the French would call a "monumental" look, is apt to more or less con-

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trol the planning and interfere with its convenience. To allow this is in the eyes of practical men the greatest offence of which an architect can be guilty. His safeguard is in the most careful consultation with those who can give him the information he needs. The trustees of the Johns Hopkins fund, to whom Prof. Huxley administered his famous advice, have improved upon it by requiring the architect of their hospital to prepare his plans in consultation with and under the supervision of a surgeon who is a recognized authority in hospital construction, the first perhaps in the country; and it was not till his plans were thoroughly digested and worked out, that they set him free to design his exterior. For a building whose requirements are so peculiar and so complicated, this was the safest thing they could do, even if they pushed it unnecessarily far. So it may be in other cases. In the long run the public will insist on having what it wants; and, as we have once said, if it does not get this from architects it will turn from them to those from whom it can get it. Fortunately for architects, they have the power in their own walk, if they will use their opportunities, to meet the wants of the public as no others can.

THE French societies, both of architects and mechanics, are in many respects an example to their fellows elsewhere; not the least in that they know how to work together for the same ends. Our readers know something of the working of the *Société Centrale des Architectes*, and we have lately had occasion to refer to the Society of Masons and Stone-cutters. The French associations of master mechanics do not find themselves obliged to spend all their common energy in fighting against strikes, but make it their honorable business to encourage the proficiency and education of their workmen. The *Société Centrale*, as is known, has for some years been interested in providing means of technical instruction for workmen, a work in which its late president, M. Victor Baltard, the architect of the famous *Halles Centrales*, took especial interest. The societies of mechanics have engaged themselves in the same work. The masons' society has just established a course of free instruction, which is to include primary teaching, practical geometry, and *coupe de pierre*, by which is meant of course, not "stone-cutting" as we commonly phrase it, but the geometrical determination of the forms of stones in finished masonry, — what in the books is called stereotomy. The society also offers prizes annually in competition for the solution of problems which it proposes, to be worked out either by models or by drawings. The competitions are open to all French *appareilleurs* and *tailleurs de pierre* under forty years old. The *tailleur de pierre*, we may say, corresponds to our stone-cutter; while the *appareilleur* has not his counterpart among us. He is a workman whose duty it is to provide templates and patterns for the stone-cutting, and to lay out and sometimes plan the bonding of the stones. He must therefore be expert in the *coupe de pierre*. The good understanding that exists between the architects and mechanics is shown in the fact that the jury appointed by the society to decree its prizes is composed of architects as well as builders and mechanics.

MEANWHILE England is, as the United States have been, full of conflicts between masters and workmen. The long strikes in the building trades still continue; and the importation of workmen from the United States, which there has lately been an effort to discourage, seems not to have entirely ceased. A writer in the *Building News* urges the solution of the masons' quarrel by the much-debated resource of piece-work. This seems the natural and irrefragable last resort; and if the day system is to be forever productive of quarrelling and strikes, it is difficult to see to what other resource we are to turn. It is, however, undesired both by masters and men, except in certain kinds of skilled labor: by the masters because it is complicated and laborious; by the men, we fear, because it holds them up to their work, and because it allows to the diligent and skilful their natural advantage over the incapable or idle. But no such expedient, however accepted, though it may take away many occasions for quarrelling, can remove the real difficulty, which is a want of common interests between employers and workmen. Pecuniary co-operation may do much in the various forms that have been suggested, — sharing of profits, which, however, brings as its unwelcome correlative, sharing of losses; cumulative wages, insurance and pension funds, and the like; and something of this sort seems quite desirable. But all these things leave out the best bond of union, which is common interest in the common work for the work's sake. Here it is, in trying to stimulate such an interest, that the French masters show their wisdom; and we earnestly hope that their example may spread. In our own country the Boston Chapter of the American Institute of Architects has tried to do something in this way by offering prizes to workmen; and we have heard something of movements among mechanics in favor of technical schools for their workmen. We shall be glad to hear more of them.

WE have received the official programme of the Eleventh Convention of the American Institute of Architects, which, as has already been announced, will be held at Boston on the 17th, 18th, and 19th of this month. The place of meeting is the Massachusetts Institute of Technology. The morning of the first day, Wednesday, will be given to the annual address by the President, Mr. Thomas U. Walter, the reports of committees, election of officers, and other formal business; and the afternoon to visiting the new buildings in the "burnt district." The evening session will be devoted to papers and debate on Fire-proof Construction. In the morning session of the second day, papers will be read: by Mr. Robert Briggs on the Relation of Moisture in the Air to Health and Comfort, by Mr. Carl Pfeiffer on Ventilation, by Col. Geo. E. Waring, jun., on Sanitary Science. In the afternoon, the convention will visit the chief new churches and other important buildings in the Back Bay district; and in the evening session will be papers on Religious Architecture. The morning session of the third day will be occupied by a paper on Colonial Architecture by Mr. C. F. McKim, and a discussion of the subject, and the closing address by the President of the Boston Chapter. There will be a visit in the afternoon to some of the old colonial houses in Cambridge, and to Memorial Hall and other new buildings at Harvard College, the convention ending with a dinner in the evening.

THE VENTILATING AND WARMING OF SCHOOL-HOUSES IN THE NORTHERN UNITED STATES.

BY DR. F. WINSOR OF WINCHESTER, MASS.

Read at the meeting of the Social Science Association at Saratoga, Sept. 6, 1877.

THE necessity for providing in some way for a sufficient supply of pure air in every room intended for use by human beings is now admitted by every intelligent person. The question is, What is a sufficient supply, and how can it be best supplied?

What tests have we of the purity of air which are at once reliable and practically available? The senses, and certain simplified processes of chemical analysis.

If we remain in a confined air which is growing vitiated by the products of respiration or combustion, we are warned of its deterioration by a growing sense of discomfort, by dull headache, desire for a long breath, inability to attend or to enjoy. But persons who are not accustomed to a good air in their rooms are not thus warned until the vitiation has become great. It is very satisfactory to notice how nearly the verdict of the healthy and well-educated senses on this question of the purity of the air in a given room corresponds to the verdict of chemical analysis. When the latter announces the proportion of carbonic acid to be above .7 to 1,000, the former say this air is too "close;" and so on through "bad," "foul," up to "unendurable," when the proportion of carbonic acid in the 1,000 reaches 1.4.

The only one of the approximate chemical tests for the purity of air which it seems to be in place to mention here is the so-called household method proposed by Dr. Angus Smith for carbonic acid; namely, "Let us keep our rooms so that the air gives no precipitate when a ten and a half ounce bottle-full is shaken with half an ounce of clear lime-water." Carbonic acid is of course taken here, as it is in treatises and papers of greater authority, as the most convenient test known to us of atmospheric purity; one sufficiently exact for most practical purposes in discussing the efficiency of ventilation. Though not in itself dangerous (except in so far as it displaces oxygen), it is so seldom found in rooms used by man, unassociated with other gases more dangerous but less easily estimated, that it is accepted as the best practical exponent of the degree to which these other more dangerous and more insidious gases prevail in the air of any room. The best known among these eminently dangerous gases are carbonic oxide, sulphuretted hydrogen, sulphide of ammonia, sulphurous acid, caprylic acid, and probably a Protean host of other volatile excretions from lungs and skin. These very rarely exist in any schoolroom

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in a proportion so large as is common in the case of carbonic acid; but their presence is appreciated by the senses much more readily.

GERMS.

Of so-called "germs" we say nothing, save that, whatever they may prove to be, they must be least numerous and least dangerous in proportion as the ventilation is most complete. There are in addition to these gases the various forms of *dust*, organic and inorganic, from the wooden floors, the leathern shoes, the cotton or woollen clothing, the decomposing dirt of the streets which is brought in on shoes and clothes. In the ordinary ill-ventilated schoolroom this dust not only floats in the air when first liberated, and is stirred up afresh from the floor by every motion of the feet, but it clings to the walls, and is absorbed by the porous plaster, so that the scrapings of the walls of a typically bad schoolroom have when moistened yielded a horribly offensive mass of putrefaction.

STENCHES.

If any one clings to the old whim that nasty smells are not unwholesome, it is because he ignores a mass of evidence and of personal experience sufficient to convince all who are open to conviction. From the indefinable but unmistakable smell which so sticks to all hospitals (except the best modern pavilion or hospital tent and barrack), and which is found associated with a mortality closely corresponding to its pronouncedness, to the nauseating stench of a dysenteric stool, — bad odors are fraught with danger, and warn us against filth diseases. If we are told that imagination and fastidiousness have much to do with the suffering caused by stenches, we reply that children are certainly less observant of bad odors than adults, yet they are the earliest and most frequent victims to the filth diseases. A friend tells me that at a frequented seaside resort, a gentleman who had quite lost the sense of smell was warned away from the mouth of a drain, which opened near a seat on the rocks to which he liked to resort, by finding that his visits there were always followed by headache. Dissecting-room diarrhœa in students who have quite overcome the repugnance of beginning, and who are intent upon their work, is another instance in point; and instances might be multiplied indefinitely.

If on the other hand we are told that men employed habitually about sewers, decomposing manures, animal refuse, the holds of vessels, and so forth, are not exceptionally unhealthy, we answer that extended observation does not sustain such statements; that wounds do not heal well in such workmen; and that their apparent immunity is only temporary, and is analogous to the "tolerance" of certain other poisons, which is recognized as being set up by small and repeated doses of them, but which proves only that the system is not *shocked* by an evil to which it has become accustomed, not that it is no longer harmed by it. As well assert that a man in whom phthisis has come to a stand after having disabled one lung, and impaired the other, is as well off as a man with sound lungs, because he sustains life and performs some of its duties on an allowance of air with which the latter would find himself reduced to gasping distress and helplessness.

It is wise to suspect danger wherever there is any degree of stench, and to act upon the suspicion; although it is not always safe to feel secure where no closeness or ill odor is perceptible.

ABUNDANT PURE AIR ESSENTIAL TO HEALTH.

The history of military hospitals, which has been ably and convincingly set forth in recent monographs, furnishes irresistible evidence of the necessity of pure air to good health, and proves that with abundant fresh air the sick and wounded recover in structures so rude as scarcely to be called shelters, faster by fifty per cent than in the most substantial hospitals without it; undergoing when removed from the latter to tents, even in severe winter weather, an improvement so rapid and wonderful as to be called "magical."

It has been demonstrated that nothing so hastens the recovery of wounded and sick *men* as an abundance of pure air, but the world was a century and a quarter in learning the fact. Can it be doubted that this same pure air is the best means of preserving and brightening the health of school-children? Are we to be a century and a quarter in learning the application of this lesson to them? Will the country of free public schools grudge in every town and village the necessary outlays to keep the children's bodies in good condition while their minds are in process of educating?

CUBIC SPACE. — FREQUENCY OF RENEWAL.

How frequently it is necessary to renew the air in any room inhabited for the whole or for any considerable part of the day, and how many cubic feet must be allowed per head to its occupants, are questions which have called out the most competent investigation in all civilized countries; and the results of these investigations agree tolerably well as regards the dimensions and the frequency of renewal which should be the standard for hospitals and barracks. When these questions are raised in regard to schoolrooms, there is considerable diversity of opinion. It is agreed that such rooms, being continuously occupied but a few hours out of the twenty-four, and admitting of being well aired and cleansed during many of the remaining hours, do not require such large provision of space as is necessary in hospitals, barracks, and similar buildings. And the best modern authorities (Bosc, Varunstrapp, Sanitary Committee of Philadelphia School Board, Committee of Medico-Legal Society of New York) fix the minimum between 250 and 275 cubic feet per scholar. But practice lags far behind correct theory. The English law requires the principal schoolrooms and classrooms of national schools to contain at least 80 cubic feet of internal space, and 8 square feet of area, for each child in average attendance. Kiddle and Schem's Cyclopedia of Education require at least 108 cubic feet, and 9 feet of floor space. In New York city the requirement is for 70, 80, 90, 100 cubic feet respectively in the various ranks from lowest up!

We cannot do better than to adopt Dr. Lincoln's estimate given in his paper read in this department last September, and published in the *Sanitarian* for November last; viz., 250 cubic feet per head, or (assuming the room to be 12½ feet in height) 20 square feet of floor space per head for "children in their teens." Such children need *more food* than men and women; all physiological processes go on more rapidly in them than in adults. *They should have as much room.* Primary scholars foul air more rapidly than older children in other ways than by breathing, — as must have been generally observed, — being less nice in their habits, and having less self-control; so that a supply of air graduated exactly on the proportion of carbonic acid exhaled by young children will be certain to prove insufficient, because this gas is not in their case so true an exponent of the degree to which the air has been vitiated as in the case of older children and of adults. Moreover, the fact that young children, are, from the delicacy of their organization, much more quickly and profoundly affected by foul air, must make us insist upon giving their schoolrooms a generous measure of pure air, instead of cutting them down to a mathematical minimum based upon the estimate of their excretion of carbonic acid as compared with that of adults.

HUMIDITY.

The problem of supplying fresh air is, in our climate, complicated by the necessity of heating it, and in so doing, of changing other of its properties than that of temperature. We cannot take out-of-door air at a temperature of 32° and heat it to 120° or 150° without changing it from a condition of wholesome humidity to one of unnatural dryness, as is demonstrated by the shrinking and warping of the wood-work in our houses, and by a certain sense of oppression, irritation, and harshness, which many persons are only too familiar with in the atmosphere of ordinary furnace or stove heat.

Pure outer air at 30° Fah. contains, if quite saturated, 2.21 grains of water to the cubic foot. Heat it to 60° Fah., and it falls to 34.2 per cent of saturation; to 70° Fah., and it falls to 24.6 per cent of saturation; to 80° Fah., and its percentage of saturation is but 17, which is said to be dryer than the air of the desert. Under these circumstances it of course becomes a powerful absorbent of moisture from our bodies, especially from the pulmonary mucous membrane. It is not probable that this absorption from the pulmonary mucous membrane is absolutely harmful; witness the effect on healthy lungs of outer air at 0° Fah., which must be raised *in the lungs* in four or five seconds to 90° Fah., with a corresponding increase in its capacity for absorbing moisture, all at the expense of the lungs, which yet sustain no harm (see Derby on Anthracite, p. 28). Although opinions differ widely as to the hygienic influence of a very dry air as a general condition, — i.e., *without* as well as *within* doors, — there can scarcely be a doubt that the alternation from the very dry and hot air of many rooms to the cold and comparatively very moist outer air, and *vice versa*, to which most of us are exposed many times a day in winter, is very trying, and is a frequent cause of disease. It is almost universally, i.e., popularly rather than scientifically, admitted, that heating apparatus should be supplied with means for hydrating the air they warm, and that this hydrating is seldom sufficiently provided for.

It is not so generally understood, that if we moisten the air we may reduce by several degrees the temperature without suffering discomfort. This is certainly true for temperatures between 60° and 70° Fah. Of air above 75° Fah., it may be said that it grows less endurable in proportion to the degree in which it is moistened; and the same is certainly true of temperatures below 40° Fah., *damp* cold being harder to bear and more productive of diseases than dry cold. Moreover, it is frequently forgotten in the discussion on hydrating the winter atmosphere of our dwellings, that the very arid conditions before mentioned are *never* to be found within our rooms, whatever may be the case within the hot-air chamber of an iron furnace. Without any attempt at moistening the air we heat, it does take up a very considerable amount of water after it leaves the heating apparatus. Beside the steam from kitchen and washrooms, and contributions from every article and being in the house, it must be borne in mind that an actual though insensible passage of air is constantly occurring through the materials of the walls, be these what they may, and that this air from without has the humidity of the outer air. Consider, too, the amount of water which many building materials hold in their pores (a brick can absorb one-tenth of its weight of water), and we shall cease to wonder at the fact that the relative humidity

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in our dwellings is never below 40 per cent. In school and other assembly rooms it is always higher, in consequence of the watery vapor with which every human expiration is strongly charged.

Apart from the influence of moisture on our sensations, there are practical limits placed to its prevalence in our rooms by the phenomena of condensation which begin to manifest themselves on windows and on ordinary outer walls whenever the humidity within reaches the saturation point of air at the temperature of the inner surface of the glass, and we then have frosted windows, if not walls, — a difficulty which can be overcome only by double windows and outer walls of proper thickness and construction. It is of course highly desirable that every schoolroom should be thus furnished and constructed, and much fuel would thus be saved; and the sanitarian should press the importance of this matter upon the community, and especially upon all officials connected with schools. But it is certain that for years to come his representations will be heeded by but few of those who have the practical direction of schoolrooms and buildings; and until public opinion is educated to the point of action, the vast majority of schoolrooms will still have single windows and thin outer walls, and their inmates will object to their being coated with water or with frost. There are some who insist that an interior atmosphere is unwholesome unless its humidity approaches the point of saturation, and that it should be at least as high as 70 per cent of that condition. It would seem that this view ignores the well-known effect on body and mind of "dog-day" weather, i.e., of a warm air saturated with moisture; as it does, on the other hand, the effect on body and mind of climates which are permanently dry. I regret that I cannot give statistics of the observed humidity of such climates; but certain well-known facts with regard to parts of Colorado, New Mexico, and Mexico are very significant. It must be a very dry atmosphere where fresh meat can be cured by hanging it in the open air, yet these regions are notedly salubrious. The same is true of certain parts of Peru and Bolivia, which are rainless, and so dry that houses are built of rock-salt. Sprenger, in his life of Mahomet III., bears enthusiastic testimony to the healthful and invigorating quality of the climate of Arabia. A native of the Alps, and familiar with the Himalayas, he admits that the air of neither of these mountain chains was so strengthening or so vivifying as that of the Arabian Desert. He says: "Nowhere is a man happier than in the desert; the sky is always clear, the air even in hot weather is strengthening and refreshing; every breath we draw makes us thank God for life." Palgrave testifies to the same effect, though less enthusiastically. But the following passage contains the strongest statement as to the sanitary properties of dry air with which I am acquainted: "The Harmattan is a wind which blows from the north-east (the interior of the Sahara) to the west coast of Africa, between Cape Verde (15° N.) and Cape Lopez (1° S.), a line of over 2,000 miles, lasting sometimes one day, sometimes fourteen or more days. During its prevalence every thing dries up; leaves become so parched that they can be rubbed to dust between the fingers; covers of books, though shut up in trunks, warp as if they had been exposed to a fire; household furniture cracks; panels of doors split; any veneered work flies to pieces. Another and the most striking feature of the Harmattan is its salubrity. Though prejudicial to vegetable life, and occasioning disagreeable parching effects on the human species, it is highly conducive to health. Those laboring previously under fevers generally recover during its prevalence, the feeble gain strength, and malarial diseases disappear."

Again, it must not be forgotten that moisture favors decomposition, and if we make the air of an audience or school room very moist, we certainly render more dangerous, as well as more offensive, whatever filth may be there, whether it be from dirt — commonly so styled — or from the animal exhalations of the skin and lungs; in which case it would seem that a very humid air would make ventilation more necessary, rather than less, as some of the advocates of very abundant hydration contend. Another point to be borne in mind is that every room where persons are assembled is receiving from their expirations a very considerable amount of watery vapor, — from each child about 1 oz. of water per hour. This would furnish (for a school of 50 pupils) 3 *pints of water per hour*, — a rate of evaporation quite equal to that from most furnaces supplied with an evaporating pan. If it be objected that this is very impure vapor, and therefore needs to be increased by so much more pure watery vapor, the reply is that it is inevitable, and is made no better by the addition proposed. It must be got rid of by ventilation. Suppose 50 children, each giving out 500 grains of water (=25,000) per hour, — a suitably large room will contain (250 x 50) 12,500 cubic feet, — and as the air is supposed to be changed three times in an hour, the total hourly supply of air = 37,500 cubic feet. Therefore there exists constantly in the air the amount of $\frac{25000}{37500}$, = $\frac{2}{3}$ of a grain per cubic foot, coming from the children's lungs. If saturated air at 70° Fah. contains 8 grains per foot, $\frac{2}{3}$ of a grain will represent 8 per cent added to the figure expressing the humidity; air at 50 per cent humidity will be raised to 58 per cent. The writer is inclined to agree with Dr. George Derby that in our winters the air of a schoolroom, which does not exceed 68° Fah., requires no artificial evaporation on the score of health. It will maintain itself above 50 per cent of saturation whatever heating apparatus is used; and in our climate, which is dry as compared with Europe, it may be questioned whether it is wise to accustom ourselves to a humidity within doors very much in excess of that which prevails without. (*Anthracite and Health*, p. 32.)

THE ILLUSTRATIONS.

MERCANTILE BUILDING, SYRACUSE, N.Y. MR. ARCHIMEDES RUSSELL, ARCHITECT.

(Syracuse, N.Y.)

THIS building now erecting in Syracuse is to be used for general business purposes; forty-five feet front on North Salina Street, and one hundred feet on Church Street. The fronts are built of Trenton front-brick, and the finish is Berlin Ohio sand stone. The estimated cost is $30,000. The owners are Hickox and Young, Hier and Aldrich.

DETAILS OF THE PROVIDENCE RAILROAD STATION, BOSTON, MASS. MESSRS. PEABODY AND STEARNS, ARCHITECTS.

(60 Devonshire Street, Boston, Mass.)

This is a drawing belonging to the series which was prepared by the Portfolio Club.

SCHOOL OF FINE ARTS AT MARSEILLES, FRANCE. M. ESPÉRANDIEU, ARCHITECT.

In pursuance of the policy which we have adopted of issuing from time to time illustrations of the most important work of foreign architects, we give with this number a view of the principal façade of the School of Fine Arts at Marseilles, designed by the late M. Espérandieu, city architect.

A FEW MORE WORDS ABOUT "QUEEN ANNE."

LONDON.

THE so-called revival grows apace, and, whether we like it or not, forces itself more and more on our attention. Almost every month new buildings are completed, which brilliant in red brick, tile roofs, and white sashes, claim kinship with the now fashionable style originally begun by a few very clever men. Every tyro now must needs cut his teeth or win his spurs in the wake of his betters. The leaders have a lot of imitators; and, as might be expected, the work of the latter is not marked by the refinement and study typical of the best efforts of the school. In the presence then of so much work of a kind, a few words on the rise and progress of the so-called revival may not be out of place. First, then, it may be remarked that as "Queen Anne" grew out of the Gothic revival, so the first architects who took it up were Gothicists to a man; as also the elements of the style are eminently picturesque and artistic, so its first disciples were artists in the true sense of the word; whatever they touched bore the impress of artistic power: hence it is not to be wondered at if the earlier works of the school charmed us by something more than their mere originality. We have said the style was developed from the Gothic revival: we shall see how this came about. The great difficulty with the Gothicists had always been, how to make their favorite style adapt itself to the many varied requirements of a modern dwelling-house. Originally, in the early days of the revival, every thing of a later date than the thirteenth century was pooh-poohed and frowned upon as unworthy of notice, and some enthusiasts even went so far as to declare that no architecture worthy the name had been done in England since that date. This, of course, was soon found to be nonsense, but not before we had searched Italy and France in quest of new inspirations coming within the sacred date; then men began to study and think more of the work lying under their eyes in their own land; as they did so, the special beauties of English late Gothic became every day more apparent, and what was despised before was faithfully and lovingly followed now; the process once begun, no one now cared to name a date after which nothing worthy of notice was to be found and appreciated. This was a healthier feeling at any rate, and one more creditable to our common sense and good taste; at least we had ceased to despise the men who had lived and worked before us, as had been done in the early days of the Gothic revival. If this was a boon to the church architect, it will be easily seen what a great gain it was in domestic work. Stern Goths such as Mr. Burges and others had been trying their hardest to make a Gothic castle look like a modern English house, we need not say with what result; but now the limitation once removed, what endless charms and beauties are presented to us in the old English manor and farm houses scattered over the length and breadth of the land! The wonder is, we could ever have been so blind as to overlook them; here we had a precious treasure-house of domestic work open to our hands; and the more we looked at it, the later down the stream of time we followed its course, we could not but be struck with its evident adaptability to all the requirements of English life. And withal how picturesque it is! — high-pitched roofs to weather the storm,

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tall chimney-shafts to carry away the smoke, broad bay-windows to sun ourselves in, quaint nooks to chat in, or cosey chimney-corners to gather round in winter — there is no end of features; and all English, all our own. From the earliest times down almost to our own days, all this noble domestic work was a gradual development, a history of our domestic life in bricks and mortar, interrupted only when the rage for revivals began. First we tried Greek, and turned up our noses at every thing Gothic; then we tried Gothic, and did *ditto* by every thing classic; ignoring the fact that there were plenty of men who lived before us, who, though they did neither, knew not only how to build to suit their work to the requirements of their age, but to do so artistically, and as true architects to unite the useful with the beautiful. With the best of our Gothic men studying such a field, there could be but one result, — the narrow-minded ways of the earlier days of the revival were swept away as the beauties of the later work made themselves felt; in fact, a sort of walking-back process began which showed itself first in houses of a late English Gothic type; pointed windows gave place to the broad, many-mullioned lights and other features characteristic of the period. As was to be expected from their architects being trained in a Gothic school, the first of these houses were still essentially Gothic, though of a very late type; half-timbered work plays an important part in their design, and the mouldings and carvings bear the impress of sixteenth century-work: the earlier manor-house is still the model. But as the work progresses, still later models are followed, till we have houses after the seventeenth and eighteenth century type, or what we now call "Queen Anne." And the reason of this is not far to seek. The study of the subject proved the fallacy of all so-called revivals, and showed the gradual development of the old work to be so complete, that instead of stopping the sequence as was done when we tried to put a Greek temple in an English park, it would have been more to the purpose to take up the story and carry it on from the point it had reached, and with the material lying ready to our hands. This is what the so-called revival of Queen Anne really is; an attempt to continue the work of English domestic architecture in the true spirit of English work, and with the materials most readily to be had in any locality where it may be wanted. Why it has been called "Queen Anne" is more than any one can tell: the name has about as much to do with the style as our old Gothic had to do with the Goths, and that is simply nothing; but there, it has received its name, and as one is about as good as another, "and probably better" as Lord Dundreary used to say, we presume it will now remain.

But in thus taking up the thread of English domestic architecture where it was broken, it is as impossible for us to ignore all that has been done during the Gothic revival, as it was for the Gothicists to ignore every thing later than the thirteenth century. We cannot blot out any page of the history if we would, and it would not be good for us if we could. We have learned a great deal, as we have unlearned much, during the past forty years. We have the whole heritage of the past for reference if we would be wise to know good things. Hence we do not seek to revive, — there is no such thing as revival in the case, — but to go on with the greater knowledge acquired since the history was broken in the end of the eighteenth century. That this phase of English work adapts itself better than any other to our modern wants, simply means that it comes nearer than any other to our immediate time, and that the requirements of our houses in their main outlines have not changed so very much during the present century. Our principal building material is brick: it seems made for the use of brick. The ordinary sash window is, after all, the most convenient for most purposes: quite a feature is to be made of this simple requirement. We want good joinery and good plaster-work inside, as we want good brick-work outside: again we find ourselves at home with it in this — high pitched roofs to brave the rain and snow of our northern climes, and tall chimneys to carry off our city smoke: we have as many of those as desired. The development, even so far as it has begun again, has been a gradual and vigorous one. It is a long stride from the Leys Wood to the New Zealand Chambers of Mr. Shaw, or from the Combe Abbey or Cloverley Hall, to Kinmel House of Mr. Nesfield; but it is a perfectly natural one, though it does not by any means follow that, having done a Renaissance house like Kinmel, which is almost as advanced classic as Wren's work at Hampton Court Palace, we are never to do a late Gothic house like Leys Wood.

A recent writer on the subject of Queen Anne in the *American Architect*, who signs himself "S.," falls into the very common error of supposing that works like "Leys Wood" or "Cloverley Hall" come under the cognomen of Queen Anne at all. He says, "Except the great and novel invention of the lintel, it would be hard to say what there is of Queen Anne" about such works as "Cragside" and "The Wispers" by Mr. Shaw. The answer is, there is simply nothing of the style in either, and nobody ever said there was; not even "the great and novel invention of the lintel!" The lintel came to be used in late work and later times, simply because it has been found much more convenient than the arch for the doors and windows of our house: that is all; and the lintel in itself is no more Queen Anne than it is any thing else. Here again we may note the absurdity of the name given to all this late work, seeing that of the types on which it is founded quite as many existed before as after the reign of the now famous Queen Anne. Thus we have shown how this great re-action in favor of old English work was developed out of the Gothic revival, — it was almost the natural result of it, — and in some fifteen years it has grown into what we now call the Queen Anne style. We see its first beginnings in the earlier works of Mr. Philip Webb, Mr. Nesfield, Mr. Shaw, Mr. Davey, and others: we see the result in the swollen ranks of its practitioners and the increasing number of their works.

Contemporaneously with the forward movement in architecture proper, has also taken place that wonderful re-action in favor of household taste in such matters as furniture, interior decoration, stained glass, metal-work, etc., than which nothing more striking has been seen in the art-world of England during the last half century. Since Pugin wrote his wonderful "Contrasts," showing what modern upholstery was and what it might be, the movement has grown with the architectural development, in some respects even faster than it, until now it is a distinct school with settled principles, and a definite purpose in view. To no one in this department can greater honor belong than to the great art firm of Morris & Co.: they gave it form and substance; they promoted the study of old examples and the designing of new; their wall-papers alone mark an era in decorative art, while their furniture and glass and tiles have really been at the foundation of most that has come since. With artists of such power of color and design, it is little wonder the influence they exerted was immense: it affected every thing; carpets, curtains, china, stuffs of all kinds, were freed from the absurdities and mediævalisms which had too long disfigured our rooms; and our houses began to wear a healthy air of homely comfort and good taste more in harmony with the improvement in their architecture, showing what a strong hold the new school of thought has taken on the principles of design in all around us. Now there is no mistaking the vitality of the work being done: it may not at all times be in the very best of taste, the best that can be got; but at any rate it is vigorous, and is constantly making progress, rather too much indeed to be always good. And it must go on: there is no stopping the movement now, wherever it may yet lead us. Some classicists say it will end in all becoming classic; some Goths, that it will break down altogether and come to nothing. It does not seem to us that we need concern ourselves as to what the end may be; what we have to do is to do our work honestly and well, and leave the future to those who come after us. As well might an old thirteenth-century man have bothered himself about what his Gothic would become in the fourteenth or fifteenth century; what the better would his architecture have been if he had? The writer above referred to as "S.," who wrote a very smart article condemnatory of "Queen Anne" some time ago in the *American Architect*, taunts the style with want of principle, and indeed denied it the elements of a style at all. "If," says he, "Queen Anne consists in the application of classic detail to buildings designed on Gothic principles," or rather as he adds, "on architectural principles, it is entitled to be considered a style, if and in so far as the detail is consistent with and expressive of the construction to which it is applied." Now this is just what it does do: its detail is consistent with and expressive of its construction; that is to say, its elevations are expressive of the plan and purpose of the building within. In this it bears the impress of its Gothic descent. It is very easy to ridicule any building in the manner "S." does "Lowther Lodge;" but we submit that an impartial examination of the works of the school will be found to bear out what we have said. No one contends for the invention of a new style: we have yet to learn that a new style was ever "invented" by any man or set of men. "S." seems to think it a hard matter to fit classic detail to a building "designed from the ground plan" so as to make it into an artistic whole, unless its requirements are exceedingly simple: of course it is, unless the designer be an artist, and then there is no difficulty about the matter, whether the requirements are simple or complex; and we shall never have any architecture at all, Queen Anne or otherwise, worthy the name, unless we have artists to design it. With them there is no "impossibility" at all "of combining classic detail architecturally with free planning and free designs;" indeed, the very essence of the style is its freedom from the trammels of classic architecture properly so called. And then "S." quotes the building of the English Commissioners at Philadelphia as an example of modern "Queen Anne," particularizing the square timber framing as a special Queen Anne feature; when the fact of the matter is, the said building is not Queen Anne at all, but an example of old English sixteenth-century work, of which the timber framing was one of the special features. Whether it has been carried out well or ill is another matter: it is not Queen Anne. This is only an example of the loose way it has come to be the fashion to write on the subject; and, the Philadelphia building to the contrary notwithstanding, we humbly think American architects have very much to learn in the way of building artistically from the old half-timbered English houses of the sixteenth century. "S." further declares that some one has extolled Queen Anne as "combining the honesty of the Gothic with the refinement of the Renaissance," and characterizes it as a "dark saying;" but it seems to us that to be good architecture it must be both "honest" and "refined," though we have yet to learn that either of the

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styles quoted had a monopoly of these virtues, so that if we find Queen Anne in possession of them it is no more than the others have had in their turn.

The best work of the school is both *honest* and *refined;* and so far as the rest fails in these, so far does it fail in being good architecture. We know of no more refined work anywhere than the front of Mr. Shaw's house in Queen's Gate; and "Lowther Lodge," in spite of "S.'s" strictures, is at least an honest piece of building. Indeed, even among the enemies of the movement it is admitted that at least it has produced good honest building, if nothing higher in the way of architecture; and good building we certainly have got by it. Before the revival most of the new streets built in the metropolis were run up of very "shoddy" bricks, and covered with equally "shoddy" compo, which in a few years began to come to pieces, and was constantly under repair. Now the era of compo fronts is doomed, and as the bricks now form the wall facing, they must be of a better description. The bricklayer may be said to be one of the greatest gainers by the change: what with cut-brick fronts, mouldings, and carvings, his craft has almost risen to the position of a fine art; and some of the more recently built buildings can be quoted as among the finest examples of brick-work in the world. Italy and Spain had once a brick architecture of great note; England seems in a fair way of acquiring the same through the efforts of the Queen Annists. There is an honesty about this which there is no getting over, and the "refinement" of much of the work solely depends on the artists who design it. Another advantage this revived brick-work has procured for us, and that is in the important element of color. The gray lines of compo fronts are giving place to the bright warm glow of red brick, thus winning for our streets an element of the picturesque, long sadly absent from them. Any one can imagine how appropriate the warm hospitable color is among the magnificent timber and rich verdure of an English park; but few who have not realized it can know what a godsend the bright red is in breaking up the dull gray monotony of our city streets. Then as with brick-work so with wood-work: now the internal fittings of our houses are carefully designed and admirably worked out; chimney-pieces, staircases, doors, panelling, all have improved in the most striking manner, in that semi-classic mode which is found at once the most appropriate and most convenient to suit our every-day requirements. Will any one say that all this is not real solid progress? The interiors of our houses now are perfect studies compared to what they were ten or fifteen years ago.

It is all very well to laugh at bric-à-brac, at the blue-china mania, at the rage for Japanese fans, at the craze for "collecting;" but each and all of these "fads" is but an evidence of an advance in matters of art, of which they are the outcomes, — an advance which has been developed and fostered mainly through the artists of the so-called Queen Anne school. The very fact, that if a man wishes to succeed in it he must be an "artist," is in itself a great gain. The mere manufacturing architect will never be able to do "Queen Anne." There is a subtlety as well as an honesty and refinement in the style, that is not to be acquired by mere copying, however closely the original may be imitated, It contains just that mixture of the Gothic and the Renaissance springing from a knowledge of both, which none but an artist knows what to do with; and if it helps to develop a race of artist-architects, it will do more than either of the revivals before it did; for the number of men who could do really good Gothic might be counted on one's fingers; and as for those who knew any thing of Greek, they have ceased to exist. This, then, is the position of the movement at present, which it is a "sheer affectation" to say is "unworthy the attention of grown men." Every year is adding, and will add, to the number and importance of the buildings designed by it. It is thoroughly English, in that it is founded on English work, and adapts itself to our feelings and our ways of life. Therein lies at once its strength and its reward, its vitality in the present, and its hope in the future. And if for England, why not for America? Whatever goes on here is sure sooner or later to affect that "Greater Britain" of which it has of late become the fashion to speak. In an admirable paper read by Mr. Peabody before the Boston Society of Architects, he says it is "a fact, whether fortunately so or not, what goes on in England in an art, as in many other matters, is to a certain extent quickly reflected here;" and so long as the relationship between the two countries is so close, this is likely to increase rather than otherwise. And farther on in the same article, Mr. Peabody declares that "there is no revival so little of an affectation on our soil, as that of the beautiful work of the colonial days," giving as an instance the old homesteads still to be found by the wayside from Hingham to Plymouth. It seems to us he strikes the key-note of the question for America in this. You, like us, have a heritage of the key-work on which it is all founded; and if ever America is to become possessed of an historical style, it must spring from the work of the old colonists. You have good brick, you have splendid timber, you have the practice of timber-constructed houses; only waiting the artist's hand to carve out a style of your own. Preserve then your old colonial architecture, and it may yet bring forth fruit of which all the world of art may be proud. J. M. B.

THE TOMB OF CECILIA METELLA. — The tomb of Cecilia Metella, near Rome, is to be the site for a fort.

INTERIOR DECORATION OF THEATRES.

MR. PERCY FITZGERALD, F.S.A., in an article in the *Art Journal* on "Theatres, their Construction and Arrangements," says of the decoration of the auditorium, —

"An interesting inquiry is, what is to be the prevailing tone of the hall, that is to say, the background, or lining, against which the figures are set off? The outside panelling of the balcony, etc., does not fall to this category. The prevailing white and gold of theatres like Covent Garden certainly aids in imparting that air of carpentry, as it suggests wood painted white and touched with gold. Where there are balustrades rather than balconies, the treatment should be as of metal or stone, the whole being profusely gilt. Nothing, as it has been long since established, can be meaner than our house-painters' and decorators' conventional manner of 'picking out' mouldings neatly with a little gold. Indeed, that a *salle* should be painted merely to convey the effect of painting, seems scarcely to be accepted as a principle. The effect should be produced rather by details, though of course there must be a basis of color of some kind. M. Garnier recalls the superb effect of the rich and profuse gilding of the old Opera House; and what made particular impression on him was the great thick cornice that ran round the *plafond* aloft, and which framed the simple and mysterious blue welkin, wherein floated the figures of a mysterious apotheosis. This gold seemed like jeweller's old gold: it was yellow and dim, like the dome of the Pantheon; and this hue seemed so subdued and harmonious, that M. Garnier seriously proposed having the gilding of his new theatre toned down by some artificial process. Gilding in such broad masses, and thus properly subdued, is suggestive of solid construction. With this gold was joined a rich mellow crimson, with the finest effect. In the new Paris house this effect of dimmed gold was artfully conveyed by painting the parts a rich yellow, and gilding the points on which the lights struck.

"Crimson appears to be the favorite color for all theatres, and it is arrived at by a sort of process of exhaustion. Violet lights up badly, as indeed any one may notice at the Olympic and Court Theatres, where it is in favor. Green and blue have a certain feebleness, and with yellow reflect unfavorable tones on the face. Orange, according to Eugene Delacroix, a competent judge of color, would be the most effective for a theatre, and for setting off faces and figures. As M. Garnier admits, it is 'a sumptuous and powerful' tone, and would steep the *salle* in the richest tones — so rich, indeed, as to borrow all the glories of the stage. This is, indeed, the serious objection. But it is surprising that our own theatre-decorators, who are reckless of such accidents, and only think of the indiscriminate raptures of the critics of an opening night, should have used it plentifully. Crimson, however, remains, and it is curious to find that it obtains in the following important theatres: Antwerp, Berlin, Bordeaux, Cairo, Constantinople, Copenhagen, Dublin, Frankfort, Genoa, Geneva, Hamburg, Hanover, Naples, London, Messina, Moscow, Munich, Paris (Opera), Philadelphia, Stockholm, and Vienna. That of the Fenice at Venice is all pure white Persian, and gold; that of Turin, black and crimson; of Santiago, crimson with golden *fleur-de-lys*, a truly barbaric magnificence; Prague, pure white; and the Grand Theatre of Moscow, bright amber; that of Mayence, yellow and gold, bordered with crimson velvet. Another rich combination is that of the Pergola at Florence, gray and gold, a mixture somewhat *bizarre;* and finally that of Amsterdam, a rich brown and gold. The current temper of taste sets in favour of crimson or red; and this color, it was determined, should be the ground of the new house. 'If we could guarantee,' M. Garnier says, 'the glow of health to every face in the *salle*, to every cheek a rose tint, the combination, under a brilliant light, would of itself form a fine and appropriate mass of color.' The tone that would nearest approach this effect would be accepted as the most satisfactory; and it might, at least, have the result of reflecting such a pleasing glow on the pale faces of the votaries of fashion. This may seem a little petty, but it is no doubt an element to be considered.

"The sort of *bijou* style of decorations that is now in vogue in London theatres is of the gaudiest. Strange mixtures of green and mauve, flaunting colors, even silver and violet: it is all fantastic, in bad taste, and destructive of scenic effect. The audience, whose eyes have been dazzled between the acts with this heterogeneous mixture, when the act drop rises, will find the scenes poor and faded by comparison. Neither is this excessive brilliancy of color acceptable to the audience, to whom it is trying: neither is it profitable, as these striped satin stuffs fade, while the daring colors, 'aniline' mostly, soon 'fly,' and have to be renewed. Far more in keeping is the other extreme, the treatment of the average German theatre, where a bald and almost shabby air seems to be cultivated.

"The proscenium entrance into the land of poetry and enchantment is a matter that, like every thing connected with a theatre, must be directed by a principle. The system now fashionable of giving it the shape of a frame, often gilded like the frame of a picture, however rich, seems incongruous, as such a surrounding of moving figures is not what is sought to be presented. Neither is the meagre opening cut in the wall — a smooth, level edge, with pillars or cornice — at all in keeping. Such, painted over with arabesques and figures, seems too trivial, and appears to be the opening of a caravan rather than of a building.

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"We must ask ourselves the question, to what part of the building does the arch of the stage belong? It may be taken to be pierced in the fourth side of the *salle*, while it must be strong enough to serve as a support; and the style must therefore be of a solid and massive character. The stage proper is merely a platform placed close to this aperture.

"In all our new theatres, however, it is thus treated as part of the *salle*, and is decorated in harmony with it. According to this principle it, the richly-gilded frame, becomes a sort of curtained window or doorway of our own home through which we look at the sports going on outside. Another theory assumes that the proscenium is merely the front of a different building, the interior of which is seen through an arch; and this view is certainly supported by the system of construction of the new Paris and other houses, where the building containing the stage actually towers above the *salle*, as can be seen from the outside. But we have already shown that this accentuating the regions over the stage is undue and false art. It is, however, very difficult to decide this nice point, especially as the great arching, treated largely and handsomely, seems to be the entrance to a new building and not a doorway or aperture through which we are to look at something beyond. This was a conspicuous feature in the old houses. Those grand archings were the worthy vestibules of the fairy realms beyond. They were bold and even magnificent in their proportions. In some instances, as in the old French Opera House and the Bordeaux Theatre, they took the shape not of a mere profile of an arch, but of a broad archway supported on coupled columns, with the curtain draped in festoons inside. This is a contrast, indeed, to the thin 'cardboardy' partition which answers to the formation in the new theatres. In the other instances we are on the threshold of the realms of enchantment, to which this archway is the entrance."

CORRESPONDENCE.

GRACE CHURCH.

NEW YORK.

DULL as matters are at present, many of the architects here are looking forward to active work during the coming winter, and hope to be able to offer work for contract early next spring. It is true that similar expectations were indulged in a year ago, but the realization did not follow; and a summer of ordinary work, and not much of that, has been passed through. Even with offers of labor and material at extraordinarily low prices, clients have sought in addition a cheaper class of work, and with alterations and additions have sought to make present structures answer growing needs; and, where a far-sighted policy would have counselled new work and general changes, the fashion of economy has led the owners into a waiting policy, until when the rush of building does come it promises to be a lively one.

W. T. Beers & Son, architects, have just finished the design for Grace Episcopal Church of Harlem, to stand on One Hundred and Sixteenth Street, near Third Avenue. On a lot 80 x 110 feet they erect a chapel 45 feet frontage, and with the transepts at the rear 64 feet wide and 100 feet deep. Upon either flank of this, filling up the street-front, are two ordinary brown stone dwellings 20 x 45 feet each. The church, or more properly from its size a chapel, will be of the Norwood stone from Closter, N.J., along the ridge of the Palisades. This will be in coursed rock-face work, while the finish is to be in Connecticut brown stone tooled work. At either corner of the face there will be towers, one about 60 feet high, the other rising 87 feet, as a belfry; abroad line of steps will lead to a stone porch, projecting five feet from the face of the building. Above this will be a great window, the pediment overhead running up to 60 feet. On either side of the several porch doors, will stand polished blue granite columns with white marble caps and bases. The church will be lighted by clere-story windows, the roof carried on an open timber framing, springing from the side walls without aisle columns. The sanctuary will extend back under a lower arch 13 feet to an elaborate wooden screen. The pews will be in oak in common with all the interior wood-work. Other than an organ loft across the front end of the church, there will be no galleries. A basement 12 feet in the clear will be used as a schoolroom. The cost will not overrun $50,000. The Church of the Holy Saviour on Twenty-fifth Street, and the Calvary Chapel on Twenty-third Street, are from designs by Mr. Beers. He has also now in hand a residence for Mr. Wesley at Portchester, N.Y. It is a stiff design with two-story mansard roof, with no attempt at the picturesque. In plan it measures 60 x 80 feet, and will cost more than $45,000.

THE MANCHESTER TOWN-HALL CLOCK BELLS.

EIGHTEEN of the twenty-one bells of the great clock and carillon machine for the new Town-Hall are now in the tower "stocked," and ready to be put on their centres, and the other three are swung in their positions. The clock and carillons, which are combined, will when erected be the largest work of the kind in Europe. The clock is being constructed to strike the hours upon the great bell of seven tons, and to chime the four quarters on ten bells, the time to be shown upon the four illuminated dials of 16′ in diameter. The frame is on the horizontal plan, of solid cast iron, 11′ long, 4′ 6″ wide, and 4′ 2″ high. All the wheels are of gun metal, engine turned, cut, and polished. The main wheels of the striking and quarters are 2′ 6″ diameter, and the main wheel of the going part 2′ in diameter, and all the rest of the wheels in due proportion. There are two engraved and silvered dials on the clock, showing minutes and seconds, for the purpose of regulating and adjusting the outer hands, and for taking observations. The striking cams and levers are all hand steel-faced. The barrels are made of cast iron turned and grooved. The escapement is the "double three-legged gravity," which is found to be infinitely superior to all other kinds for perfect time-keeping. The pendulum is a compensated one, made of zinc and iron tubes, to beat each two seconds of time, with a cast-iron cylindrical bob of three cwt. to be suspended from a cast-iron bracket fixed on a stone corbel built into the wall. All the lines to carry the weight are of the best steel wire. There is an automatic gas apparatus fitted to the clock for turning the gas up and down, contrived to suit all seasons of the year, providing for long and short days, so that no attendance whatever will be required to turn the gas on and off, thus effecting a considerable saving in time and gas. Messrs. Gillett & Bland were the inventors of this apparatus, which they first applied to the Bradford Town-Hall clock. The clock is so constructed that the changes for the quarters can be altered at any time, and provision is made for connecting the clock with the electric current for registering Greenwich mean time. The hour bell G is the largest that will be struck upon by a clock in this country, excepting the one at Westminster Palace; the great bells at Oxford and York being struck by hand. The quarter bells will be much heavier than those at Westminster, and this will be the only instance in the United Kingdom where the quarter chimes will be played upon ten bells. The carillon machine is constructed on Gillett & Bland's improved patented system, of which they were the original introducers. It will play thirty-one tunes on twenty-one bells, weighing altogether about thirty-two tons, being double the weight of those at Worcester Cathedral and Bradford Town Hall, and, as there will be a much more extended scale and a larger number of semitones, a greater variety and a better selection of melodies will be played in five different keys. This has never yet been done on any thing like such a scale in this country. The vast improvements that Messrs. Gillett & Bland have made in the machinery are admitted to be incomparably superior to any thing of the kind on the Continent. A fresh tune will be played for every day in the month, the change of tune taking place at midnight by a self-acting shifting apparatus, and the order will be altered monthly. There will also be a barrel pricked with changes or peals which can be played for several hours, or all day if required. The machine will also have an ivory keyboard attached, so that any musician will be able to play with his fingers tunes upon the bells with as much ease as upon an organ. Each tune will be played two or three times day and night, at six, nine, three, and twelve o'clock; and the machine is so constructed that any particular tune pricked upon the musical barrels, can be played at any time, and it is fitted with an apparatus so that the tunes can be stopped or let off at any moment. The tunes will be let off automatically by the clock. Although the machine is constructed to play thirty-one tunes, there is no limit to the number of tunes that can be played by simply having fresh barrels with seven tunes on each, which can be had at any time; or, instead of having seven tunes on a barrel, it could be pricked with a long piece of music, so that by having fifty-two barrels it would be possible for the machine to play a fresh tune for every day in the year. Every part of the clock and carillon machine has been manufactured at Messrs. Gillett & Bland's steam clock factory, Croydon. — *British Architect.*

NOTES AND CLIPPINGS.

BOOKS RECEIVED. — "Mahan's Industrial Drawing" (illustrated), by D. H. Mahan, LL.D.; revised and enlarged by Daniel F. Thompson, B.S. John Wiley & Sons, publishers, New York. Price $3.50.

"New Constructions in Graphical Statics" (illustrated), by Henry T. Eddy, Ph.D. D. Van Nostrand, publisher, New York. Price $1.50.

VENTILATION IN NEW YORK. — In public school No. 28, in West Fortieth Street, there are two thousand children. The building is badly ventilated, has no cellar, and stands close to a crowded tenement-house. The rooms are only kept habitable by sprinkling the floor with disinfectants. One teacher has died already of typhoid fever, and another lies very ill with the same disease.

ENFORCING THE BUILDING LAWS IN PHILADELPHIA. — On the 25th ult., Capt. Hutchinson, superintendent of the West Jersey ferry, Philadelphia, received a notice from the building inspector, requiring him to demolish the fine new ferry-houses the company are erecting at the foot of Market Street, Philadelphia. It is claimed that in some respects they are in violation of law. The company will test the matter, as it will be a heavy loss to tear down and rebuild the structure, now far advanced. It was proposed to expend $125,000 in this improvement.

UNSAFE BUILDINGS. — A row of unfinished brick buildings on Norris Street and Trenton Avenue, Philadelphia, which had become dangerous, was pulled down on the 22d ult., under the orders of Building Inspector Bowers.

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PUBLIC BUILDINGS. — The construction of the public buildings at Austin, Tex., and Harrisburg, will be proceeded with, all questions as to the title of the lands upon which the buildings are to be erected having been satisfactorily settled.

THE BANGOR CUSTOM HOUSE. — The westerly wall of the Bangor Custom House foundation has been for a long time gradually giving way. When originally built, a rocky bottom was not reached, so that it was simply set on a gravel bed. The water has been constantly at work, washing the bed of the stream deeper and deeper, till now it is nearly a foot below the bottom of the wall; and the water, washing the dirt in many places from under the wall, has caused the fall of several large granite rocks. Supervising Architect Lynch has set men to work, and the wall will be repaired; but it is no small undertaking. The north-east wall is bulging out, and will also before long be a source of trouble. This cannot, however, be corrected without building that part entirely over, and nothing will be done at present in regard to it.

THE LOSSES SUSTAINED AT THE PATENT OFFICE FIRE. — We give a carefully compiled statement of the models and records lost, and such as were saved, at the great Patent Office fire, on the 24th ult., reported by Louis Bagger and Co., Solicitors of Patents, Washington, D.C. In the North Hall, the models of the following inventions were entirely destroyed: wood-working (four classes), wood screws, wire-working, water-wheels, water distribution, tubing and wire, stabling, sheet metal, seeders and planters, saws, railways (four classes), pumps, pneumatics, ploughs, ores, needles and pins, nails, mills, metal-working (7 classes), metallurgy, horseshoes, harvesters, harrows, hardware manufacture, grinding and polishing, garden and orchard, files, dairy, casting, brakes and gins, nuts and rivets, bolts, bee-hives, baths and closets, aëration and bottling. Aggregate number of models destroyed in this hall, 57,000; valued at $885,000. In the West Hall, models of bridges, brushes and brooms, tobacco, threshing, lime and cement, stone, roofing, presses, paving, mechanical powers, car-couplings, masonry, churns, journals and bearings, engineering, hydraulics, hoisting, glass, fences, excavators, carriages and wagons, carpentry, butchering. Aggregating 36,500 models at a total value of $511,000. In the East and South Halls, besides the famous relics of the Father of our Country, and other patriots, models of the following inventions escaped destruction; sewing machines, fire-arms, looms, carding machines, trunks, tanning, surgery, sugar, stills, signals, preserving food, plating, paint, optics, fats and glue, oils, measuring instruments, manures, leather, ice, hose and belting, horology, harness, gunpowder, gas, fuel, electricity, drafting, dental, cutlery, coffins, clay, clasps and buckles, chemical miscellaneous, caoutchouc, boots and shoes, bleaching and dyeing, beer and wine, artificial limbs, felting and hats, fine arts, fishing, furniture, games and toys, governors, jewelry, kitchen utensils, knitting and netting, lamps and gas-fitting, laundry, locks and latches, music, ordnance, paper-making, paper manufactures, photography, printing, projectiles, safes, ships (two classes), silk, spinning, stationery, steam, stoves and furnaces, toilet, umbrellas and fans, valves, weaving, educational, dryers and kilns, crinoline and corsets, cordage, cloth, builders' hardware, book-binding, boats, beds and apparel. The first patent was issued to Samuel Hopkins, on July 14, 1790, "for making pot and pearl ashes." Up to 1836, 46 years, 10,301 patents were issued, and to date over 195,000. The annual number of patents granted is about 14,000. The annual receipts are about $800,000, and expenditures $660,000.

MEMORIAL WINDOWS AT THE BOSTON CATHEDRAL. — There have been recently placed in the Cathedral of the Holy Cross four memorial windows. One represents the scene after the resurrection, when the doubting St. Thomas placed his finger in the wound in our Saviour's side; another represents St. Vincent de Paul bearing an infant in his arms; the third is a representation of Michael the Archangel; and the fourth represents St. Patrick, and is presented by the widow of Patrick Treanor, the builder of the cathedral. There are now but four windows in the church to be supplied with stained glass.

A LANDMARK. — The centre of the United States is marked by a column of masonry in the State of Kansas.

GASOMETER. — What is probably the largest single-lift gasometer in the world — that built by the Boston Gas-Light Company at the corner of Island and Girard Streets — has not been used since its completion a year and half ago. It has a capacity of 1,250,000 cubic feet.

PRE-HISTORIC MAN. — Indications of a pre-historic people, which are plentiful in South-western Colorado, have lately been discovered in Western Nevada. Ancient pottery and undecipherable writings on the rocks are the most common tokens. At one place, engraved upon a rock, is the nude figure of a man holding in his right hand a shrub, the outlines of which show considerable artistic skill.

MONUMENT. — The James Lick monument is being made in Montreal.

CLEOPATRA'S NEEDLE. — On the 21st ult. the Egyptian obelisk left Alexandria in tow of the steamer "Olga."

THE LONDON NATIONAL OPERA HOUSE. — It is not unlikely that the completion of the opera house on the Victoria Embankment may be abandoned, and a hotel built upon the same foundation.

GLASS-HOUSE CHIMNEYS. — A coroner's investigation into the cause of the fall of a glass-house chimney at Warrington, Eng., seems to establish the fact that it is dangerous for such chimneys to be allowed to stand for many years. The stack in question had been built for twenty-one years, and its fall was caused by allowing it to cool down during wet weather.

NEW BOOKS. — Messrs. Williams and Norgate will publish in November, "The Geometry and Optics of Ancient Architecture, illustrated by examples from Thebes, Athens, and Rome," by John Pennethorne. Prof. Michaelis of Strasbourg is preparing a work on the existing Greek sculptures in Asia Minor. It will include sculptures from the Mausoleum at Halicarnassus, the Temple of Athene Polias at Priene, and the Temple of Artemis at Ephesus.

COMMEMORATIVE MEDALS. — It has for some years been the custom of the Municipal Government of Paris to commemorate the completion of important public buildings by striking medals in their honor. The last two are in honor of the Church of Saint-Pierre de Montrouge, and of the new Palais de Justice. The order for a medal in honor of the new Hôtel Dieu has just been issued.

CLAY STATUARY. — Thorwaldsen's clay group of St. John, which has for some time occupied a place above the entrance of the Frue Church at Copenhagen, has been copied in marble by several of the best Danish sculptors, as it has been decided to replace the clay figures by a group of a more lasting material.

IMPERIAL THEATRE AT VIENNA. — The substructure of the Imperial Theatre of Vienna is completed. The massive foundation walls rise above the street level, and the stagings are erected. The stone used for the plinth and socle is from Wöllersdorf, and is one of the most expensive building materials in Germany: a remarkably beautiful and firm nulliporous limestone. Between two hundred and three hundred cubic feet of it are used daily by the hundred stone-cutters at present employed.

SUBTERRANEAN TELEGRAPH WIRES. — The German government is laying down subterranean telegraph wires as rapidly as possible. A line has been already opened between Berlin and Mayence, and it is now intended to join Frankfort and Strasbourg in a similar manner. The cost of these wires is eight to ten times greater than that of the ordinary above-ground telegraphs.

AN AUSTRALIAN CATHEDRAL. — A new Anglican cathedral is to be erected in Melbourne. A site has been chosen, and $65,000 subscribed.

THE KREMLIN AT MOSCOW. — The Kremlin is an elevated triangular piece of ground in the centre of the city, enclosed by a wall 7,280 feet long, and entered by five gates. Originally the Kremlin was the entire city. Collected in it are several of the prominent cathedrals, the tower of Ivan the Great, the palace of the Emperor, the "Treasury" of jewels and venerated historical objects, the arsenal, one nunnery, one monastery, and a host of bells, among others the largest one in the world. In the Cathedral of the Assumption, a building overloaded with the most curious decorations, all the Russian emperors are crowned. St. Peter, the first Metropolitan or Bishop of Moscow, lies in this church. The "Tsar Kolokol," or the "King of Bells," formerly hung in the Tower of Ivan the Great, but during a fire in 1737 it fell to the ground and broke out a piece seven feet high. This great bell, reputed to be the largest in the world, measures 68 feet in circumference, 25 feet in height, and weighs 440,000 pounds.

PRESSED BRICKS FROM BLAST FURNACE SLAG. — We are informed by the *Wurt. Gwbtt.* that pressed bricks have been made from blast furnace slag by Eng. F. Dopfer. To the powdered slag 42 per cent silicic acid, 37 per cent gypsum, 10 per cent clay, 5 per cent oxide of iron, 3 per cent magnesium, 1½ per cent sulphur, and various other materials mixed with lime are added. The mixture is given the common brick form in a steam press, and after drying in the air for three months the bricks are ready for use. The daily production of the presses is about 8,000 bricks. The cost at Wasseralfingen is 32 marks per hundred. — *Industrie Zeit.*

RELICS OF THE BUSHMEN. — Mr. E. W. Stow of the Royal Geographical Society has accumulated many valuable relics of the Bushmen race in South Africa, and describes some of them in a letter to The *Athenæum.* The bulk of the collection is of paintings found in caves: they principally represent dances, and scenes of the chase, and are variously illustrative of the customs of the Bushmen. A part of the collection consists of sculptures, one stone having been laboriously used to cut another. The outlines of some of the carved figures are said to be excellent. Among the animals represented is "an unknown pachyderm with a head which seems to recall that of the dinotherium."

THE KING'S PALACE AT BABYLON. — The palace of the kings of Babylon is still so called by the natives under the name of the Ksar. It is a vast mass, seven hundred feet each way. The walls are eight feet thick, one within another, and are strengthened with buttresses.

AN INDIAN PALACE. — The Maharajah of Gwalior is now surrounding with a garden, which bids fair to become one of the wonders of the world, his palace erected at a cost of $1,250,000, of which the Prince of Wales was the first occupant. It will contain ten garden houses, each illustrating a variety of Hindoo architecture, and a winter palace made of glass imported from Vienna. Water will be brought from artificial lakes over channels so constructed as to give that murmur which was prescribed to afford rest to Mæcenas in his villa near Rome. The garden will be kept perennially green by irrigation. The expense of all this will be easily borne by this enormously wealthy prince.

BABYLONIAN RUINS. — The ruins of an ancient Babylonian city have been lately discovered by M. de Sarzec, the French consul at Bosrah. In the course of his excavations he found several slabs and bronze figures. The ruins are not far from the River Hai.

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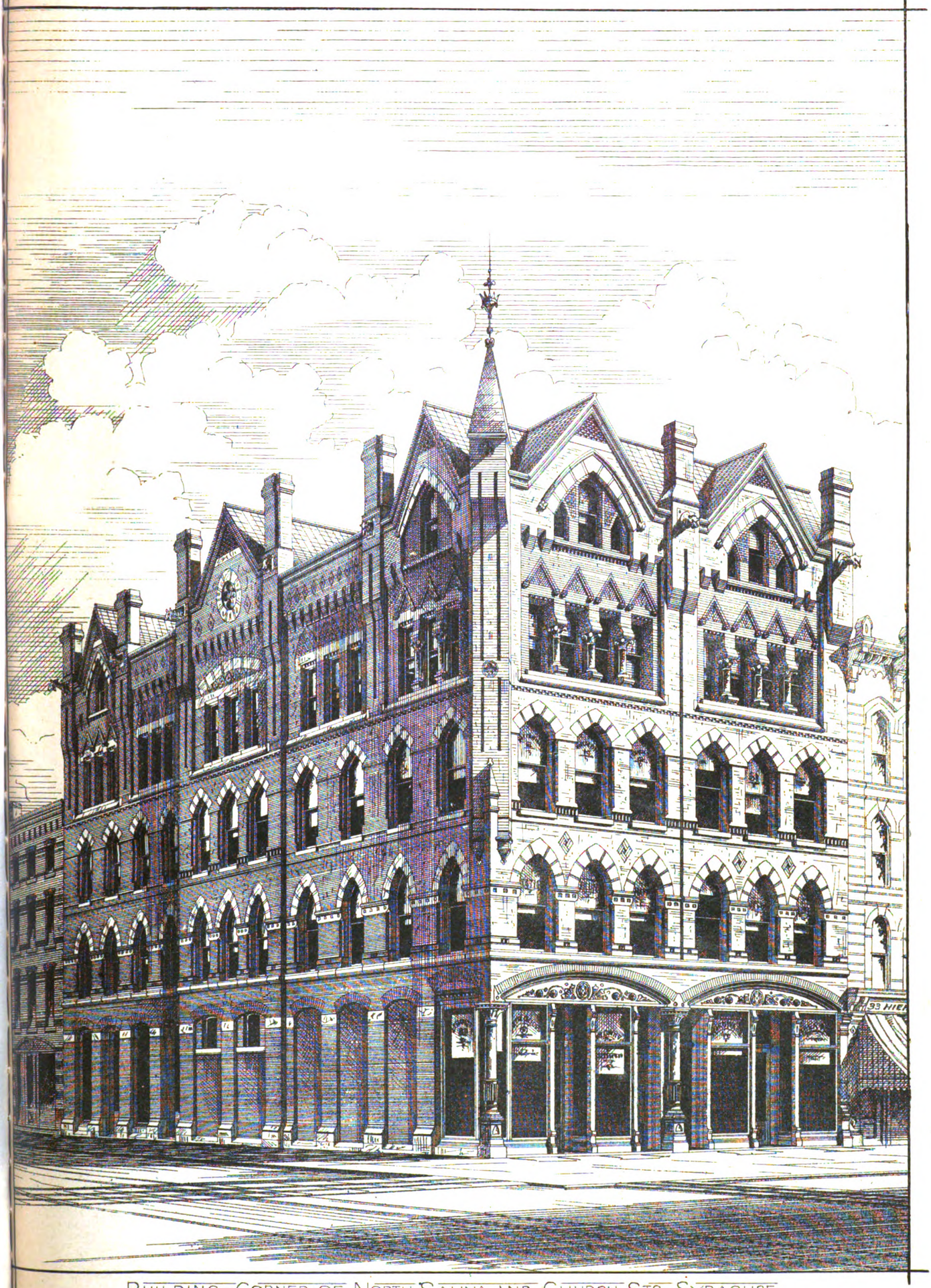

BUILDING · CORNER OF NORTH SALINA AND CHURCH STS. SYRACUSE.

ARCHIMÉDES RUSSELL ARCHT.

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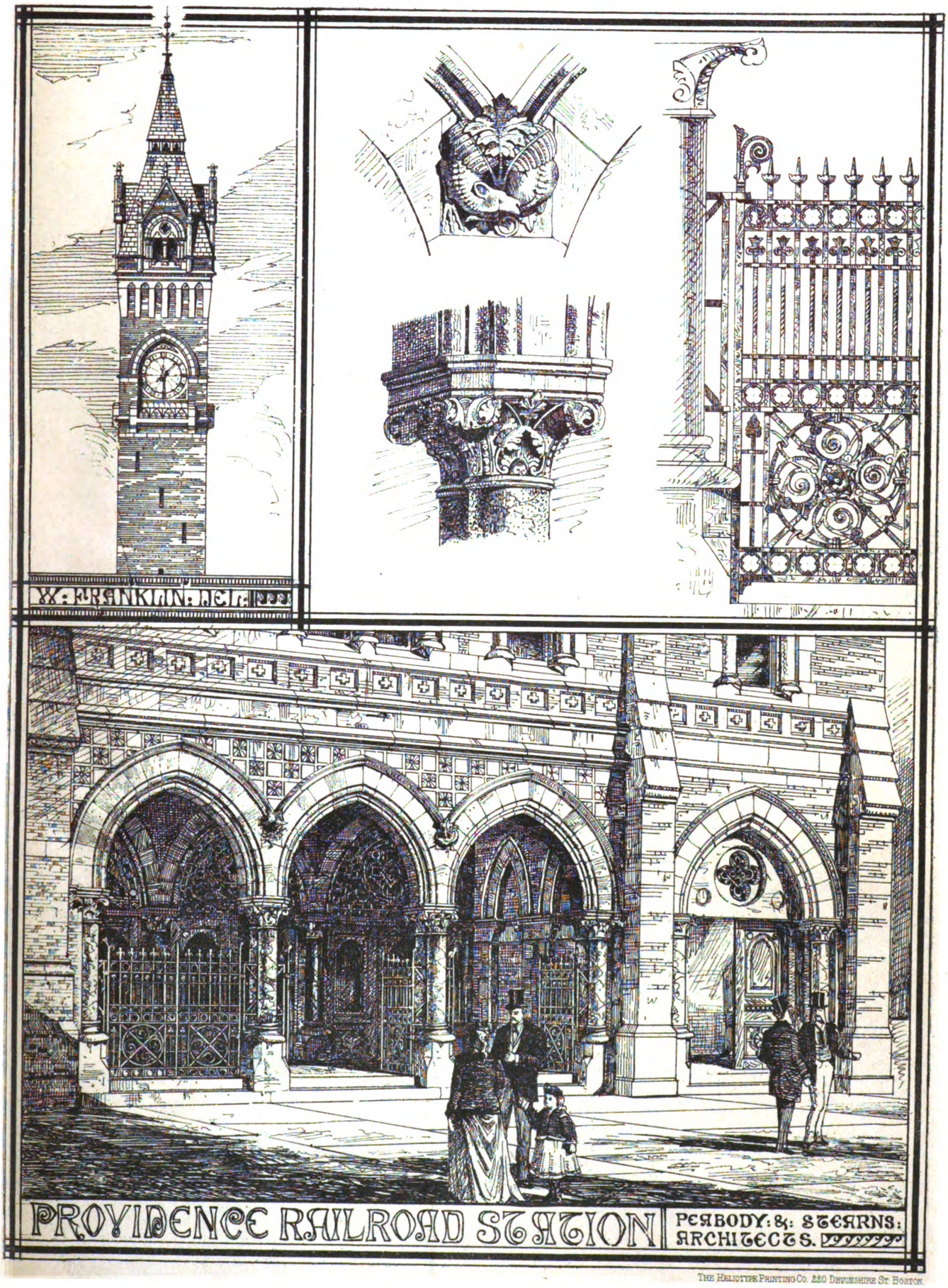

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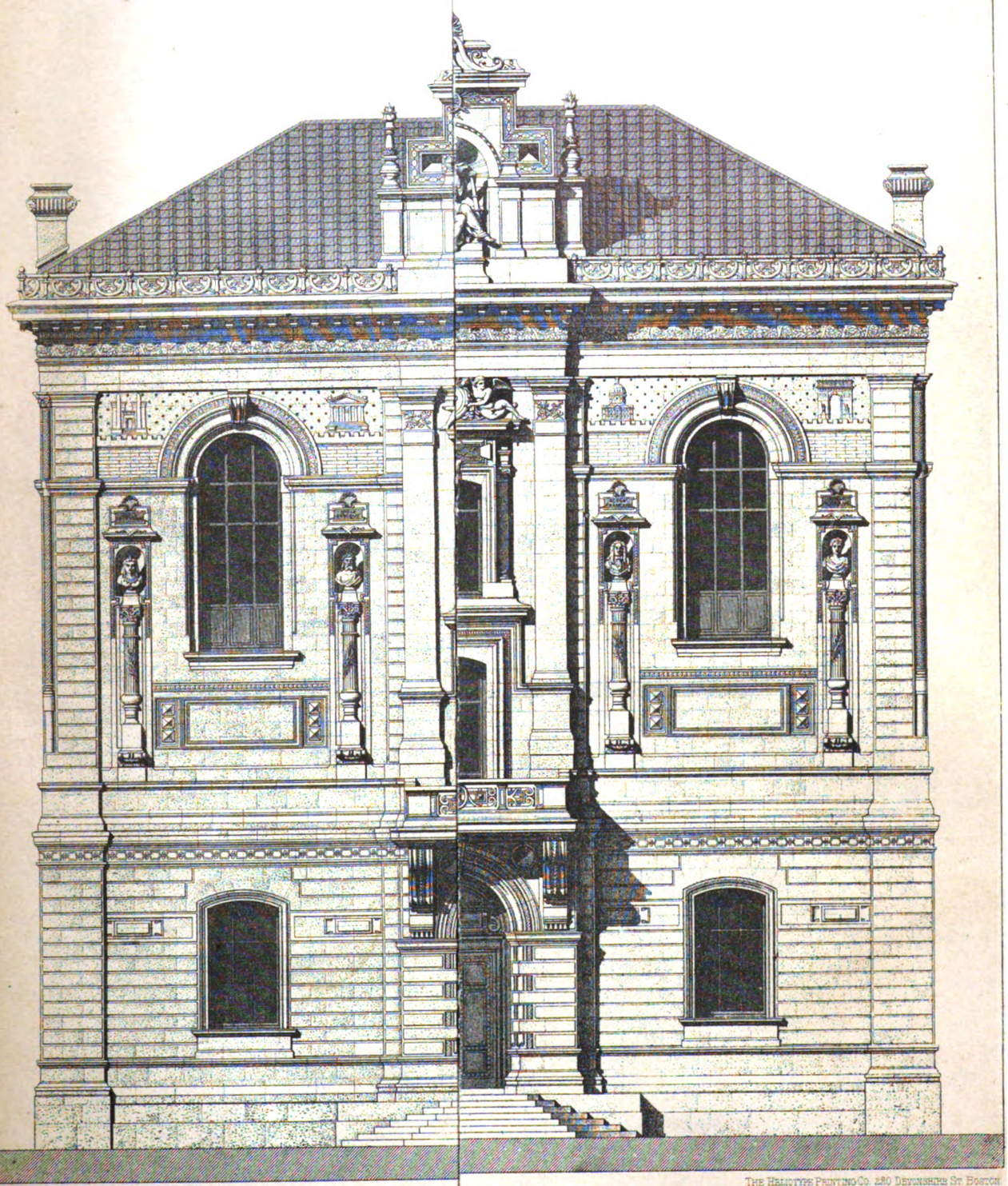

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BOSTON, OCTOBER 13, 1877.

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THE elements seem to have conspired against the Patent Office. The storm of last week, coming while the injured half of the building was yet unroofed, seems to have done as much damage as the fire itself. The tremendous rain made its way through both the upper floors in streams, drowning out the first and second stories, destroying the ceilings, ruining carpets and furniture, and doing great injury to books and papers. The marble ceiling of the north portico crumbled and fell upon the granite steps, which were broken by it, showing that the heat of the fire had partly calcined it into lime, which, slacked by the rain, crumbled away. It is a curious instance of the way in which the records of public buildings are lost or forgotten, that the manner of construction of the Patent Office was unknown till the fire and the storm revealed it. The falling of the ceilings in the north wing after the rain showed that not only was the lathing and furring of wood, but the floors themselves in that wing, though overlaid with marble slabs, were of timber. They had been believed to be of iron and brick like the others, and their preservation from the fire was ascribed to these materials. It is more than likely that but for this last accident the building might have been restored with these floors untouched, and ready to surprise the inmates some day by a second conflagration. The discovery has its useful side, for it shows how much fire from above the wooden floor will bear when covered with stone.

THE authorities have been sharply criticised for not putting the building under some kind of temporary roof at once, instead of allowing it to wait uncovered ten days for a storm. The answer of the department is, that a temporary roof laid over the walls of the building could not well be secured against violent winds, and that to put on a roof inside the walls requires a careful removal of rubbish and of iron beams which are bedded in the walls; all of which, being necessarily done by hand, for derricks cannot be trusted on the floors, is slow work. This is all reasonable, yet it is about as difficult to make an inside roof secure against rain as an outside one against wind; and if the occasion were to occur again, we are disposed to think that the outside roof would be got on as quickly as possible. Of course the disorder in the department is worse than ever, and the condition of the building is lamentable. It is so thoroughly water-soaked that it would take weeks of artificial drying to make it safe for occupation; whereas orders had already been issued to make no fires in the building, from fear that the flues had been made unsafe. The committee appointed to examine the building — Gen. Meigs, Mr. Clark, and Mr. Cluss — had reported that the walls were strong, and that when re-roofed it would be secure and substantial. Whether, after the second disaster, they will see reason to report differently, remains to be seen. If the drenching had occurred a little later, in the season of hard frosts, the exposed part of the building might have been torn to pieces; as it is, there is not much danger from this source. The committee recommend that the new roof shall be of iron and covered with copper. They suggest also that for the sake of giving more space, a cross-wing be added, which will divide the interior court, and that the two smaller courts thus formed be glazed, and used for model-rooms. Inasmuch as before the fire the building could not house the whole department, the suggestion seems timely.

THE financial administration of the Iowa State Capitol would seem to be an example for neighboring States. According to the correspondent of the Chicago *Tribune*, every year's work on the building, which has been in progress since 1870, has closed with an unexpended balance of appropriated money on hand; and the last report of the commissioners, to Sept. 1, 1877, shows a balance of nearly $34,500. The most satisfactory feature to the tax-payers must be, we should think, that the whole has been paid for out of annual taxes, so that nothing whatever has been added to the State debt by the building, — a state of things for which posterity, which will unquestionably have burdens enough of its own assuming to bear, will doubtless be profoundly thankful. How much this successful management may have been due to the slowness with which the work has been carried on, — it was begun in 1870, and has now only in part reached the level of the roof-plate, — or how much it may have occasioned it, we have no means of knowing; but any community may well be content to accept a slow rate of progress, which leaves such clean work behind it. The building was not very fortunate at the beginning; for the work of the first year, and of the first board of commissioners, was thrown away, the foundations being utterly ruined by the winter's frost. The foundation and the commissioners were removed in 1872 at a cost of between fifty-two and fifty-three thousand dollars and the delay of a season, since when there has been no difficulty. It is to the credit of the legislature, that when the original design had for economy's sake been marred by the substitution of cast-iron capitals and galvanized cornices for stone, it ordered the restoration of the proper materials. The first architects of the building were Messrs. Cochrane and Piquenard, the architects also of the Illinois Capitol. With the change of commissioners Mr. Cochrane resigned, leaving the work in sole charge of Mr. Piquenard, on whose death last year Messrs. Bell and Hackney, the present architects, were appointed.

THE original estimate of the cost of the building was a million and a half of dollars; of which a million and a quarter have already been appropriated, and as we have seen, nearly exhausted, while the building is but just reaching its roof. The commissioners have, however, not as yet substantially increased their estimate. Neither of the estimates has included the cost of the dome, which is regarded, at least in the Western States, as the indefeasible right of a State House, and which has always in imagination been part of the design. The detailed account of expenditures furnished by the commissioners, as we find it in the *Tribune*, is not arranged in such a way as to be instructive or very intelligible; but we pick out and sum up from it the items of $380,000 (round numbers) for stone, $260,000 for dressing it, and $50,000 for setting; $160,000 for bricks, and laying them; $46,000 for mortars, concrete, and their materials, mostly cement; $64,000 for wrought iron, and $2,000 for cast iron. It is not our business to inquire into the compensation of the architects, but it is not without surprise that we note the item of $4,100 for plans, about one-third of one per cent on the money thus far expended. It may be assumed that the greatest part of the architects' compensation is included under the item, "salaries $61,432," the expenses of the commissioners being separately stated as $14,074. We presume the tax-payers of Illinois, and especially of Chicago, will find something to interest them in the success with which neighbors have managed their public building.

A SORRY case of negligence among the New York school authorities has come to light. It would appear that a schoolhouse in one of the poorer districts of the city has long been in a most deplorable condition, without receiving any attention from the Board. It adjoins a filthy tenement-house so

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closely that the smells from the house are sickening to teachers and scholars; and it has been necessary to use disinfectants to make the schoolrooms habitable. The building has no cellar, and the rooms are so shut in and darkened that on cloudy days they have to be lighted with gas. When the building was opened after this summer's vacation, it was found that in the lower rooms the floors, walls, and desks were covered with green mould. The Board of Education have been obliged to undertake to put the building in repair, though it is a little hard to see what repairs can meet such a difficulty. Meanwhile teachers and scholars, we are told, have had to abandon the school again and again, sickened by its noxious exhalation, till one of the teachers has died of consumption, and another has fallen ill of typhoid fever; and who is to repair this? It is said by the Board, that the school-funds are not enough to provide schooling for all the children in New York; a matter not so much to be regretted if this is the kind of accommodation that the Board furnishes. One may lawfully infer from the present condition of things, we should think, that the Board has already more schools on its hands than it can properly attend to; and then the political duties of New York officials, as is well known, are very exacting.

The committee of the Boston City Government, appointed to examine into the fall of a scaffold at the dedication of the Soldiers' Monument in that city, have rendered their report, which is plain, decisive, and reasonable, as far as it goes. A considerable part of the report is taken up with considering who was, from the city's point of view, the responsible builder of the stand, — a question which is of no general interest, except as it indicates a loose way of doing business on the part of the city officers. The conclusions of the committee are, that the accident was due to unworkmanlike construction of the seats; that the builder of the stands is responsible for their defective construction; and that the Inspector of Buildings who visited the stands, and the assistant inspectors who inspected them, did not use sufficient care. "Responsible," in the view of the committee, undoubtedly means simply guilty; but there is another meaning for the word, which is here as important to the public as the first, — perhaps more important. It belongs to the person from whom redress is to be had, if redress is called for, or on whom penalty is to be visited. In this sense, is Mr. Paul, who is declared to be the builder, responsible to the city, and the city to the persons who have been maimed? or is Mr. Paul directly responsible to these persons? or are the committee who ordered the stands responsible to one or the other? and is the chief inspector answerable to the city for the acts of his subordinates, and they to him? or do they answer directly to the city? And, finally, to what extent will this responsibility be enforced? or will nothing be done in case the victims decide to nurse their hurts in quiet?

Mr. Wilson's Alexandrian obelisk is now fairly afloat, after between two and three months' labor under direction of the engineer, Mr. Dixon, who had engaged to superintend its transportation. The cylindrical iron casing (of boiler-plate) in which it is to be floated to England was built around it while it lay on the sand; and ways of stone were laid, on which to roll it to the sea, the casing being protected by wooden tires or jackets bound around it where it was to bear upon the ways. The obelisk is hung eccentrically in the cylinder, to prevent its rolling over and over in the water; but the mass was temporarily counterbalanced by a loading of railroad iron on the lighter side, that it might roll on land. Urged by jack-screws, and dragged by steam tugs in the water, the cylinder was in a long day's work rolled to the water's edge. Much pains had been taken to clear the shore, and the bottom over which it was to be rolled; but when the second day's effort had forced it out into somewhat deep water, it was found to be full, and examination by a diver showed that an unnoticed stone had been forced through the shell, and made a hole half a yard across. It took a week's labor to turn the cylinder into such a position that the hole was uppermost, and could be mended, and to empty and float it. Then the wooden jacketing was stripped off, the iron counterpoise removed, and the structure floated in its proper position, drawing eight feet at one end, and ten at the other, with a displacement of two hundred and eighty tons. This was the condition of things on Sept. 8, after which, as we understand it, the craft was to be decked and rigged in some sort for its voyage to England, in tow of a merchant steamer, for which a three and a half inch steel wire hawser is provided. Meanwhile there is considerable discussion in London, as to where it had best be put; most people apparently favoring some position on the Thames Embankment, but authorities — or projectors — by no means agreeing. It is now said that there is a chance of having the companion obelisk in New York. The newspapers tell us that the Khedive is willing to present Cleopatra's Needle to the city of New York, if she will ask for it and bring it home. The men who are now bringing the Wilson obelisk to England offer to bring the other to New York in the same way for a hundred thousand dollars, at their own risk; and Mr. Charles Storrs has proposed to bear one-fiftieth of the expense, if the remainder can be provided for.

HATFIELD'S TRANSVERSE STRAINS.[1]

At a time when our public is just awaking, under pressure of disaster, to the necessity of intelligent construction in buildings and of proper theoretical training for constructors, the publication of a treatise on construction, especially intended for architects, is very seasonable. Such theoretical knowledge of construction as is needed for ordinary exigencies is by no means abstruse; yet a great many of our architects, we are ashamed to say, have none of it, while those who acquire it during their preliminary studies are too apt to neglect it till it grows very rusty. Mr. Hatfield's book is almost if not quite the only work of the kind in the language, — the only one, so far as we know, that is specially adapted to the wants of the architect. The accessible books — those which had any serious pretension — have been general treatises on statics, or books which passed by the ordinary problems of the architect for the more complicated ones of the engineer, or else books on the practical mechanism of building rather than its mechanics.

This work undertakes to give the architect just what he needs. It is written throughout with intent to make it a thorough treatise for the student and a useful book of reference for the practitioner. It does not cover the whole ground of the theoretical construction of buildings; being limited, as its title indicates, to those parts of his work which deal with transverse stress, — floors, roofs, girders, trusses, etc. But the ground it proposes to cover is very thoroughly examined, and the American reader will find that the problems to which the methods of building that are in use here give rise have been very fully considered. The book is not without the interest which is due to independent investigation, for the tables appended to it are new; many of the problems discussed, though familiar in practice, are new to the books; and in many cases the well-known principles are enforced by the record of new experiments.

The book begins with the discussion of the most elementary principles, and gradually develops them into higher applications. The method of moments is introduced as "the application of the lever principle," a condescension to the unlearned which perhaps was hardly necessary. The graphical method is constantly used, even for simple solid beams, which is probably judicious, considering the development which this method has lately received and the importance of making the student well acquainted with it. We have first the theory of beams under transverse pressure, with concentrated, multiplied, or distributed load. The theory is then applied to girders and floor beams; and the loading and dimensions of floors, both in dwelling-houses and warehouses, are studied in the light of some new experiments, of which the most interesting concern the weight and movements of the live load to which ordinary floors are subjected. The problems are treated with reference both to rupture and deflection, by both algebraic and graphical methods, and for floors both of wood and iron. The discussion is extended

[1] Theory of Transverse Strains, and its Application in the Construction of Buildings; including a full discussion of the theory and construction of floor beams, girders, headers, carriage beams, bridging, rolled-iron beams, tubular-iron girders, cast-iron girders, framed girders, and roof trusses; with tables, calculated and prepared expressly for this work, of the dimensions of floor beams, headers, and rolled-iron beams; and tables showing results of original experiments on the tensile, transverse, and compressive strengths of American woods. By R. G. Hatfield, Architect, Fellow American Institute of Architects; Member American Society of Civil Engineers; author of American House Carpenter. New York: John Wiley & Sons, 15 Astor Place. 1877.

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to cast-iron girders as well as wrought iron, and to tubular girders. Considerable space is given to the consideration of trussed girders and roofs. The work closes with a series of useful tables computed from experiments by the author. They give sizes of beams needed for floors of various spans in dwelling-houses and warehouses, for the various woods commonly used in framing — hemlock, spruce, Georgia pine, and white pine, — and for rolled-iron beams of four different manufactures; also the various data concerning the resistance of the different woods to transverse rupture, deflection, tension, and crushing, and to rupture by sliding or detrusion in cases of notched beams, treenailing, etc.

The execution of the work seems to be remarkably well considered and thorough. Its purpose has been not merely to present a book of handy reference, of which there are already several to be found, but a systematic treatise, which shall put its reader in possession of its subject, and treat fully the topics which it aims to include. The matter is arranged with care and judgment, for clearness of development to the student, while ease of reference to the professional man is not forgotten. With a view to this latter service, the book is provided with two tables of contents, and a very full index, — a matter of great importance in a work of this kind, but too often neglected. Special reference is further facilitated by the addition of what the author calls a directory, — a kind of digest of the topics considered, tabulated in full but compact form. The style is very simple, clear, and straightforward; and everywhere an effort is made to avoid unnecessary abstruseness. As a literary criticism, we are inclined to object to an occasional neglect of symmetry in the notation used, a quality which has more than an ornamental use.

There are cases in which apparently the author's desire to lay few principles and a uniform method before the student has led him away from solutions more compact than those he has actually employed. Thus the graphical method for two or more loads is shown by drawing a diagram of strains for each load, then, by adding the strains at any given point made by each separate weight, the total strain at the point is obtained. This is of course correct; but by laying off the weights by scale, assuming a pole, and drawing a funicular polygon, the strains would be determined in a simpler manner, especially if there are many loads to be considered. The discussion of the bridging of floors is an interesting point, and is original with the author, we presume; but we notice that the demonstration on p. 305 depends on the unexplained assumption that the three points A, E, and C are in the same straight line: a condition which no one would be inclined to take for granted. Singularly enough, the one experiment cited by Mr. Hatfield, which bears upon the point, confirms this unexpected assumption, the differences in the successive deflections being 0.192, 0.191, and 0.192 inches. But we cannot help regarding this behavior of the model as exceptional, and unlikely to be borne out in actual experience. The advantages of bridging are clearly shown; but one thing worth adding is, that it should not run up to a joist running along and against a brick wall. Bridging has a tendency to act like a scissors or lazy-tongs, and we have seen a wall pushed out an inch or more by it, especially after a shower and before the roof is on; the rain and sun causing the joists to swell and shrink.

In speaking of carriage beams it is said that as the header "is a concentrated load at the point of connection, all mortising should be avoided," and the support given by bridle or stirrup-iron. This is quite true, yet we have seen some instances where the header was tenoned into the carriage beam, and a stirrup-iron put on also: the result being not only that the carriage beam was weakened, but the tenon of the header carried the weight, and the stirrup-iron hung loose, and carried nothing. In speaking of mortising headers, it is said that the mortise should be confined to the middle of the height, which is correct; the usual practice, however, which is to the contrary, two mortises being made one above another, has the advantage of steadying the tail-beams, when the header is abundantly strong.

The subject of frame-girders and roof-trusses is treated at considerable length; the graphical method is used; and here the funicular polyglon is introduced, though we think it might well have been carried farther. The loads in all cases are taken as vertical, which is sufficient for flat roofs; but when the roof is steep the force of the wind should be taken into consideration. In such a case a truss usually has vertical loads on one-half of it, inclined loads, greater than the previous ones, on the other half, and symmetrical and vertical loads on the tie-beam (unless when it is an open-timbered roof). These might all be combined together, the reactions at supports determined by the funicular polygon, and then the strains in the members are readily ascertained. An ingenious, and as we have never before seen it, we presume an original method, of determining the reactions at the supports of a truss is given, though here too all the loads are vertical. We notice that Mr. Hatfield's analysis of trussed girders, though minute and complete, is confined to a single form of truss (that sometimes called the Warren truss), consisting of a series of simple isosceles triangles. The investigation of other forms is left to the reader; but it might have been an advantage to introduce one or more of the commoner forms with at least a suggestion of the method of analyzing them. In the few instances in which the calculus is introduced, it might have been confined to foot-notes or an appendix. Its appearance may frighten some people; but it may be skipped if desired, for it is always used for an alternative.

A book which begins at the very beginning of such a subject, and undertakes to develop the whole of it from first principles, exposes itself to a pretty severe logical test. It is extremely difficult to compress the antecedent theory of the action of forces into the dimensions which introductory chapters require, and to display it in a form to suit the untrained reader, without either falling into assumptions which are not logically warranted, or slurring steps in the development here and there in a way which the experienced reader will notice, though the student may not be troubled by it. The work is made much easier and safer for the author, and, for qualified readers the result is more satisfactory, if the abstract preliminaries can be taken for granted and simply introduced in formulæ. Thus Mr. Hatfield's book would have gained in literary form and technical elegance if he had taken his elementary discussion of forces for granted from the beginning, as he does subsequently the principle of the polygon of forces. On the other hand, since some understanding of the action of statical forces is absolutely indispensable to the comprehension of the book, and considering that architectural students are always in haste and impatient of any thing more than what they want for immediate use, we think that Mr. Hatfield is right and his book more useful as it is, and that persons who might use the book if it stood alone would shrink from it if it were weighted with the requirement of special previous study.

As it stands, those who have a fair understanding of the subject will find this work easy and interesting reading, and extremely useful for reference; those who wish for such an understanding will find it certainly not a book to be mastered without labor, but probably the best and most direct means at their disposal for acquiring what they need. It is to be wished, for the sake of our profession, that every student who proposes a serious study of architecture could be required to qualify himself by the mastery of this book or its equivalent; and we know of no book which provides the equivalent in a form so well suited for the architect's wants.

THE VENTILATING AND WARMING OF SCHOOL-HOUSES IN THE NORTHERN UNITED STATES.

BY DR. F. WINSOR OF WINCHESTER, MASS.

II.

Read at the meeting of the Social Science Association at Saratoga, Sept. 6, 1877.

TEMPERATURE OF THE ROOM.

WHAT is the proper temperature for a schoolroom?

Without attempting to fix any one absolute temperature, we may confidently assert that in the United States the general tendency is to keep it from 2° to 6° too high, or not seldom from 8° to 10° above what is most wholesome, and also most agreeable to healthy sensations. In a pure air, in a room properly ventilated, most adults are more comfortable at a temperature between 64° and 68° Fah. than at a greater heat; and children (of the legal school age) are probably comfortable at a temperature somewhat lower. They certainly seem so, and it is very desirable that they should not be trained to require more heat than is necessary. Such a demand is in itself an evil, impairing the comfort, the spirits, and the power of application of the child while in school, and exposing him to greater shock from the contrast between the tem-

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perature of the schoolroom and that of the staircases, the halls, and the street. Let it be understood that we are not advocating the practice of making children hardy by exposure to discomfort, than which nothing can be more pernicious, but the practice of allowing them to sit and study in the lowest temperature at which they are comfortable, which tends to make them hardy without risk.

That the temperature named is not too low for comfort appears plain from the experience of many persons in this country, and from the general experience in England, France, and Germany, where such a temperature as is commonly maintained in our schoolrooms (70°) is considered uncomfortably warm. It is probably the case that more clothing is worn within doors in those countries than in ours, at least by girls and women, which practice will partly account for the tolerance of a lower temperature there. In this connection we may ask, why should women be less warmly clothed than men?

Allowing the proper temperature to be between 64° and 68° Fah., the question of its existence in a given room is not to be determined by sensation alone, nor by the thermometer alone, but by the joint testimony of both, and of both in *different parts of the room.* If the decision be left to the sensations of a teacher who confines himself to a seat in one part of the room, and that usually a platform somewhat above the level of the rest of the floor, it will be made with little reference to the comfort of the children; and the case will be the same if the question be referred to a single thermometer, since few rooms have a uniform temperature throughout. Several thermometers should be placed in every schoolroom; or if there are but two, they should be moved from one part of the room to another, and *studied*, till the facts with regard to the temperatures of the different parts of the room are well understood. Moreover the thermometers must have been compared and found to be in harmony, for it is by no means uncommon to find a discrepancy of 4° in ordinary thermometers, even when hanging side by side. This done, we shall be in a position to say what window, door, or wall acts as a refrigerator.

It is to be understood that whatever temperature is fixed as the standard, it is to be tested on a level with the faces or shoulders of the children, when seated, this being the level which most concerns them. And the same temperature must be preserved at the level of the floor, or not be allowed to fall more than two degrees. Otherwise the children are certain to have cold feet and to be uncomfortable, and suffer in health. Hence the importance of having floors close, thick, and non-conducting, to the greatest attainable degree. The use of paper, — or better, of plaster, — between the two layers of the floor, conduces to this end; as does also the placing of the heating apparatus in the cellar or basement. By placing the openings for the escape of foul air near the floor, much may be done to prevent the existence of a stratum of cold air around the feet; and if this plan of ventilation include the passage of the exit flues in the space between the two layers of the floor, a warm floor is theoretically secured; and it is asserted that this great advantage is really secured in many buildings, both for dwellings and schools, where the so-called "Ruttan system" has been adopted, as is the case to a considerable degree in Canada and the North-western States of this country. It is obvious that if this desideratum can be secured by downward ventilation, that method is especially valuable for rooms on the lower floor, where also it can be most readily applied. The floors of the stories above would be warm, from the very fact that there are occupied rooms beneath them.

TEMPERATURE OF HEATING APPARATUS.

We hear and read a deal about air being "killed" by coming into contact with surfaces heated to a very high degree (as are those of most furnaces and stoves); being "robbed of its vitalizing power," etc. If these phrases have any exact meaning, it would seem to be that such heated surfaces absorb oxygen from the air, and thus diminish its capacity for depurating the blood of the lungs into which it may subsequently be drawn. But careful experiments have demonstrated that iron heated to such degrees as 600°, 700°, or even 1,000° Fah., absorbs but a very minute amount of oxygen, not enough to alter the proportion of that gas in the air submitted to such contact. Sometimes it is said that the heated iron burns the organic particles in the air which passes it, and thus renders them more noxious. But if such burning really occurs, should not its effect be to disinfect the organic dust in question? It must be remembered that one of the most efficient methods of disinfecting clothing is to submit it to high temperatures, that of boiling water being found sufficient, although it is less than one-third of the temperature of many of our heating apparatuses. It is true that we get through our hot-air inlets the products of such imperfect combustion, which, however small in amount, are offensive. Is it not probable that much of the offensive odor often noticed in air from very hot furnaces is due to the action of this air, after its temperature has been reduced in the pipes, on collections of dust, etc., in the bends of these pipes, and in the registers? It reaches these at a temperature short of burning or scorching (which might disinfect), but quite high enough to hasten decomposition.

Nevertheless the evil of highly-heated surfaces in this connection is real, if they be surfaces of cast-iron; but it does not consist in their robbing the air of any thing, but in their adding to it certain poisonous gases (notably carbonic oxide and certain compounds of sulphur) which are now well known to pass through cast-iron when heated to or above a point just below redness. The fuel which generates them most rapidly is well known to be anthracite coal, which is the fuel ordinarily used in stoves and furnaces in the Eastern States; indeed, it may there be said to be almost the only fuel for these heaters. It is therefore of very great importance that the temperature of the hot-air chamber of cast-iron heaters should not closely approach the point of "red heat," at which it begins to be pervious to the dangerous products of imperfect combustion. And it is probably safer that no hot-air chamber — of whatever material — should exceed the temperature named. To this end, the burning fuel should not come into contact with any part of this chamber, which should be amply vaulted; and an abundance of air should enter from the cold-air duct — much more than is usually admitted to furnaces — in order both to keep down the temperature of the hot-air chamber, and to insure a pressure from thence into the fire-chamber rather than the reverse.

TEMPERATURE AT WHICH AIR SHOULD BE INTRODUCED TO ROOM.

It is matter of common experience, that this temperature varies very considerably with different kinds of heating apparatus, and with the same apparatus under different managements. It rarely falls below 100°, and as rarely exceeds 175°. It is of course desirable that the temperature at the point of introduction should differ as little from the standard temperature of the room as is consistent with maintaining that standard; otherwise the seats near the inlets must be uncomfortably warm. This desideratum is best attained by introducing large quantities of air at the minimum, rather than small quantities at the maximum temperature, and by introducing them by as many different inlets as is practicable. We are so accustomed to blasts of hot air from our inlets, where it is common to find the iron-work so hot that it will burn the hand, that we are inclined to suspect the efficiency of any heater which does not present this phenomenon. But the true test is the temperature of the room in all its parts, and this may be satisfactory when the temperature at the very inlet does not exceed 70° to 100° Fah. At a temperature thus low, much more fresh cold air can be admitted to the heater than is possible when a higher temperature is demanded at the hot-air inlet; and, entering at a less velocity, it imparts a greater proportionate sense of warmth than is given by a hotter but more rapid current.

SIZE OF OUTLETS AND INLETS.

Such authorites as Park and Bosc fix the area of outlets at from 21 to 24 square inches per head in rooms of proper capacity. Bosc estimates the proper velocity of movement at outlet to be 2.33 feet per second. In the Boston City Hospital the operating theatre accommodates 240 persons, each having a supply of 700 cubic feet per hour (and a space of 2.29 cubic feet); its aggregate outlets have an area of 12 square feet, which is 7.2 square inches per head. There is "a notable absence of ether odor" while operations are going on. But here the minimum velocity at outlet is 3.33 feet per second, and in the chimney 5 feet per second. English Barrack Commissions require one square inch outlet for every 50 cubic feet in room. In our schools of 250 cubic feet space per head, this standard would require 5 square inches outlet per head. It seems very probable that a schoolroom with as much cubic space per head as this theatre, would be satisfactorily ventilated by outlets giving 7 square inches per head and a velocity of 2½ feet per second, provided it were faithfully flushed between and after sessions by open windows. At this rate the outlet area for 50 pupils would be 2.43 square feet.

The inlets may with safety be somewhat smaller than the outlets, since if air be withdrawn in sufficient quantities, it is certain that enough air will enter to supply its place; if not from the heating apparatus, then through minute cracks around windows and doors and through the very walls. Experiments with rooms in actual use show that in some instances three and a half times as much air escapes from the outlets as enters through the inlets provided as such (see Wilson's Hand-book of Hygiene, etc., p. 115); a fact which seems to the writer to teach most forcibly the double lesson that we can secure all the fresh air we need in our houses if we provide sufficient and efficient outlets for foul air, and that this fresh air will enter cold if we do not introduce it warm. And as a corollary to this, we infer that the common practice of nearly closing the so-called "cold-air box" to a furnace is as vain as it is mischievous.

SITUATION OF OUTLETS AND INLETS.

It being a fact indisputable (though by no means generally recognized in practice) that air cannot be continuously introduced into a room from which no air escapes or is withdrawn, let us first consider what is the best place at which to withdraw the vitiated air. The most desirable place is certainly that at which it is first vitiated, i. e., at the part of the room where the occupants are, the bottom of the room, as represented by a horizontal section not more than four feet above the floor. Within this space it is that

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all the exhalations from the occupants start, the expiration, the perspiration sensible or insensible, the effluvia from wet or dirty clothing and skins, the stench from filth on shoes and on the floor. Within this space, too, rises whatever dust is raised. How desirable, then, to withdraw it within this space before it mixes with and fouls the purer air above! Moreover it is within this space that the coldest air of the room is found, and especially about the feet of the occupants. If the foulest and the coldest air can be withdrawn together, there is an obvious gain in doing so. Again, it is within this space that we most want fresh and warm air. Yet the foul-air outlets are usually placed near the ceiling, thus securing the contamination of all the air in the upper two-thirds of the room by the passage through it of the foul air of the lower third; securing also the loss of much heat by providing for it an escape from the top of the room, where it is of course greatest. Of the practicability of the so-called downward method of ventilation we have abundant and familiar proof. In every open fireplace, with a good draught, we all recognize a ventilation so satisfactory, as regards the removal of foul air, that furnaces would never have been introduced into our houses if the heating capacity of the open fire had equalled its power of withdrawing bad air; and in connection with every variety of heater this system of downward ventilation is constantly coming more and more into favor. It is applicable whether the warm air be let in at the floor, at the ceiling, or at any intermediate point.

In the case of rooms having no warm room beneath, it has the further advantage of warming the space beneath the floor by the current of warmed air passing through it on its way to the common ventilating shaft. The foul-air outlets then may be placed in whatever portion of the lowest third or quarter of the room is found most convenient, the floor itself being, as in the case of inlets, the least desirable part of this space, on account of the readiness with which dirt and litter fall into openings in the floor. It is of course desirable to multiply the outlets, and thus avoid draughts, and secure the withdrawal of all foul air as near as possible to the point where it is generated. An excellent method is that of the so-called Ruttan system, viz., to set off the "sur-base" (mop-board?) a few inches from the wall, and cover the intervening space with perforated metal.

For rooms where in warm weather no motive power is provided in the ventilating shafts, it is well to have outlets in the upper part of the room also. And the same is true of evening-schools, where the heating and vitiating influence of gas-light demands a special provision. The shafts into which the outlets lead should not be in or directly against an outer wall, especially on the side of prevailing winter winds, because experience shows that the outer atmospheric pressure is sometimes powerful enough to force cold air through the walls into shafts thus placed, and to set up a current of cold air through them, thus converting outlets into inlets.

MOTIVE POWER.

The delusion that if channels suitable for the movement of air are provided, the air of a building will move through them, and always in the right direction, still lingers in the public mind; and it is still necessary to point out and emphasize the fact that such channels are quite useless unless some motive power is provided to draw the air into and through them. At the present day it may be taken for granted that heat is the only motive power practically available for this purpose. It may be applied on the inside or the outside of a shaft: within, by a fire, a stove, a gas-jet situated at whatever point of the shaft is found most convenient, or by a smoke-flue carried up within it; without, by placing the shaft in contact with a heated flue, or even in its interior. By some such means we must secure throughout the whole length of our ventilating shafts a temperature considerably above that of the outer air, and must maintain it during as many hours of every day as the room is in use. Such shafts must of course be of non-inflammable material, and must be smoothly and nicely finished on the inside, — which is seldom done, — in order to reduce friction to a minimum. To the same end their angles and turns should be as few and as gentle as possible. It is surprising that use is so seldom made of gas-jets to heat foul-air shafts. Their heating power is much greater than is generally supposed, and the ease with which they are put into or out of use would seem to commend them. One cubic foot of gas can be utilized to remove one thousand cubic feet of air. An ordinary burner consumes nearly three cubic feet of gas per hour, and is therefore equal to moving about three thousand cubic feet of air per hour, thus providing ample ventilation for four scholars. In the case of small schools in localities not supplied with gas, sufficient heat might be secured by means of kerosene lamps of the "safety pattern" hung within the shaft.

HEATING APPARATUS

may be divided into those which warm only the air already in the room, and those which warm fresh air constantly introduced from without. All of the former class are inadmissible, be they close stoves, close steam-pipes, close hot-water pipes, or gas stoves, for the sufficient reason that they warm poisonous air. Not all the latter class are admissible. Some of them allow carbonic oxide and sulphur compounds to pass through the red-hot iron walls of the combustion chamber into their hot-air chamber; others are so constructed that, after a few months of use, their joints allow the same gases to leak out; and very many are so arranged with checks to the draught in the smoke-pipe, either by damper valves or by ill-arranged admission of cold air, as to obstruct the escape of the products of combustion through the proper channel, and throw them back into the cellar, thence to permeate the whole house.

One of them, the ordinary open fireplace, is inadmissible for school use, because of its inefficiency and wastefulness as a heater, and because, in the very efficiency of its action as a ventilator, it draws into the room cold air (perhaps foul-air) at every crack and pore. There are, however, several excellent varieties of fire-place made with an air-chamber behind and above the fire-chamber, into which fresh air is admitted from without to issue warm into the room in large quantities. In this manner the advantages of radiated and of conveyed heat are combined, while the excessive action of the open fire-place as a ventilator is moderated. Such fire-places might be used with advantage in small schoolrooms, supplying as they do ventilation without other special apparatus. Certain open stoves, constructed on a similar principle, possess in a still greater degree all the advantages of these fire-places, because they can be placed in any part of the room, and connected with the chimney like the common close stove. With one (or more) of these we obtain radiated heat, good heating power by conduction, downward and efficient ventilation, together with increased circulation of the air within the room, and all reasonable economy of fuel.[1] They cannot advantageously be used in very large rooms, or in many rooms in the same building.

We repeat that no heater is admissible which does not introduce large quantities of *warmed* fresh air. This can be done with pipes heated by steam or hot water, with many varieties of the hot-air furnace, differing in plan, in material, and in innumerable details, and with the open fire-places just described. The material of which these furnaces are made is not a matter of indifference; and in the light of his own information and experience, the writer gives the preference to soapstone and fire-brick (excluding all iron heating surfaces), next to wrought-iron. Cast-iron he places last, as demanding very great care in construction and in management to make it secure against the permeation of carbonic oxide, etc. Furnaces made of soapstone and fire-brick yield a mild and most agreeable heat, can be made and managed at as little expense as any large metal furnaces, and appear, in the somewhat limited trial which has been made, to be quite as secure against the escape of noxious gas as any heater of wrought-iron.

The question of fuel seems so certain to be decided by economical considerations, that we will only say here that anthracite coal is probably the least satisfactory fuel from the sanitary point of view.

SITUATION OF INLETS.

The situation of the inlets for warm and fresh air seems to the writer a matter of less importance than the situation of the outlets, because the fresh air is certain to move toward that part of the room from which air is withdrawn. Against the usual practice of placing them in the floor, there are two strong objections: first, as before stated, because they there become receptacles for dirt and litter, which not only obstruct them, but tend to foul the air at its entrance by collecting in the register itself, or at the bend of the pipe nearest it, where they lie heated to a degree that is sufficient to favor decomposition; second, because inlets in that situation peculiarly expose the scholars to disagreeable blasts of air. It is usually the case that the whole floor space of a schoolroom is needed for constant use. But the close neighborhood of a hot-air inlet is neither a comfortable nor a desirable place for any child to be seated. Moreover, in that situation, the heat they admit probably exerts less effect in warming the walls than it would from any other situation. Wherever placed they should be as numerous as is consistent with the practical solution of the problems of construction, in order to secure the most rapid and equable distribution of heat; and they should be so disposed in regard to the outlets as to avoid the misfortune of a direct current from inlet to outlet.

SUMMARY OF CONDITIONS REQUISITE TO SECURE GOOD VENTILATION AND HEATING OF SCHOOLROOMS IN THE NORTHERN UNITED STATES.

1. Air space of at *least* 250 cubic feet per head for oldest.
   " " " 175 " " for youngest.
2. Floor space of at *least* 20 square feet per head for oldest.
   " " " 14 " " for youngest,

on the supposition that room is 12 feet in height.

3. Entire air of room to be changed 2½ to 3 times per hour.
4. This to be done by downward ventilation by exhaustion, the motive-power being heat in a shaft or chimney.
5. Outlets to be in proportion of seven square inches per head, inlets somewhat less; both as much distributed as is practicable, and neither to be in the floor.
6. Outlets to be somewhere in the wall within two feet of the floor, and entering a duct (or space) beneath it. Inlets anywhere except in the floor.

[1] F. O. H. stove.

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7. Ducts and shafts for air — whether foul or fresh — to be as direct as possible, tight and smooth within.

8. An ample shaft or chimney, in which all the exhaust ducts end, heated to furnish motive-power equal to maintaining a velocity of 2½ inches per second at the outlets (of the rooms).

9. Heating apparatus of ample size and very freely supplied with pure cold air for its hot-air chamber; its smoke-pipe to be without valve or damper for checking the draught.

10. Temperature of room to be maintained between 64° and 68° Fah. in all parts.

11. Room to be flushed with outer air at least once a day by open windows.

12. In summer, outlets in upper part of room are preferable; and in the evening schools the same are important as adjuncts.

THE ILLUSTRATIONS.

HOUSE AT HARTFORD, CONN. WILLIAM R. WALKER AND THOMAS J. GOULD, ARCHITECTS.

(37 Weybosset Street, Providence, R.I.)

THIS house is now in process of erection, at the corner of Asylum Avenue and Woodland Street, Hartford. The grade of the lot falls from front to rear of house sufficiently to bring the basement-story in the rear entirely out of ground. The underpinning is of Longmeadow brown stone, rough-split surface, with hammered margin-lines at corners and window-openings, laid in rubble-work. The roof is covered with Brownville black slate.

JOHN SHILLITO AND COMPANY'S STORE, CINCINNATI. JAMES W. McLAUGHLIN, ARCHITECT.

(46 and 47 Johnston Buildings, Cincinnati.)

This structure, now in course of erection for a retail dry goods establishment, has a frontage on Race Street of 173 feet 8 inches, by 269 feet 8 inches on George Street, and 125 feet 8 inches on Seventh Street, covering an area on the ground floor of about 33,000 square feet. The basement has a greater surface of floor, being extended under the sidewalks on all sides. Beneath is a sub-cellar, under the entire building, for storage, 25 feet below the street level. The entire floor space covers six and one-half acres. Externally, the building will be six stories above the street, being 113 feet from the sidewalk to the top of the cornice. The walls are faced with Philadelphia pressed brick, laid with black mortar, the wrought work being of Buena Vista (Ohio) freestone. The principal story will be 20 feet 6 inches in the clear, the second story 16 feet, and the remaining stories 14 feet each. With the exception of the rear portion, or shipping department, the entire space of each floor will be open, and the view unobstructed, as the shelving is but 4 feet 6 inches high. The dome, 58 feet in diameter, extends from the first floor to the skylight above the roof. There will be three passenger elevators, and two for freight. The entire building will be heated by steam.

SCHOOL OF FINE ARTS AND CITY LIBRARY AT MARSEILLES, FRANCE. M. ESPÉRANDIEU, ARCHITECT.

We give this week details of the façade of the School of Fine Arts at Marseilles, which we published last week. Both illustrations are taken from the *Revue Générale de l'Architecture.*

THE PARIS MASON.

IN a recent article upon "The Masons of Paris," we perhaps led those of our readers who are not closely acquainted with French work and workmen to confound the *maçon* with the English mason. Among our neighbors masonry includes all construction composed of stone or rubble, of brick, mortar, or plaster. The ordinary *maçon* builds a brick wall; fills in a wooden partition, or he plasters both; he imitates brick on a plaster surface, and runs a cornice inside or outside a house, with equal ability and indifference. He makes and lays *béton* or concrete; builds an ordinary stone wall; carries and hoists freestone, rubble, brick, or mortar; raises or puts together common scaffolding. The foreman of the *maçons*, called the master-companion, is the recognized superior of all the workmen of all trades engaged upon a building. Over the larger part of France the *maçon* is as common as the bricklayer is over the larger part of England; a great deal of brick-work of the more difficult kind has been done in Normandy, and even in Paris, by Englishmen, simply because there was only the mason to do it; and his notions, both of Flemish and English bond, were obviously of a crude character. In France, external walls are now generally composed of soft limestone blocks embracing the entire thickness of the wall; and party-walls are of small cubes of freestone, squared and dressed roughly, and laid often in plaster. Brick is sometimes used in the chimney flues, and the chimney-shaft above the roof is often entirely of brick. But the *briqueteur* is, like his name, often an importation. In fact, the best brick buildings executed in the south of France during the middle ages are to be found in the neighborhood of Toulouse and of the Agenais, not far from the original province of Limousin, whence the common kind of *maçon* has acquired his name, though in these days not always by right of birth. Not that the division of labor amongst workmen is less in France than in England: on the contrary, it is much greater, for in the first named country the general contractor — the farmer of petty tradesmen, and capitalist-employer of labor — is almost if not entirely unknown. There the uninterrupted use of stone as the chief constructive material has preserved to the *maçon* his pre-eminence in the building fraternity, and the original nomenclature has been handed down to the present day. In the book of Etienne Boileau (thirteenth century), the *maçons* and *tailleurs de pierre* are mentioned together, and defined differently, or rather with the distinction which now marks their labors and duties. In the larger part of England the comparative scarcity of stone, and the employment, for two hundred years at least, of brick as the chief constructive material, have caused the stone-cutter to be not only a specialist, but also a luxurious adjunct of the building trade.

The designation of the different workmen employed by the contractor of *maçonnerie* is very varied, and the pay of each is determined by the nature of the duties performed. The rough walling and other ordinary work is done by the "*limousin*," whose wages amount to hardly a franc a day more than the assistant, or, in mediæval phrase, the apprentice of the *maçon*. The last named receives almost as much as the stone-cutter; he is hardly ever to be met without his assistant, who fetches, mixes, and hands him his plaster, and who keeps him supplied with *moëllons* or bricks, as the case may be. The "*tailleurs de pierre*" are simply the cutters or rough moulders of freestone, that is, of *pierre de taille*, both hard and soft. They seldom mount the ladders; they remain under cover or in the open yard of a building in course of erection. These men prepare the blocks after they have been sawn into a convenient and necessary size or height of course; they square the edges, knock off the soft and perishing excrescences, smooth the face which is to be seen in elevation, dress the beds, and rough out the moulded profiles where directed. Only when the stone is exceptionally hard are the mouldings finished before fixing; with soft stone like that used in Paris, the mouldings are cut after the façade is put together. Such mouldings are consequently intrusted to a superior description of workman, called a "*ravaleur*," partly because he reveals out of half meaningless forms what the architect intended to express; and the work of cutting the different mouldings and ornaments upon the face of a wall is called the *ravalement* — the carved or sculptured portions being reserved for the eventual chisel of an artist who justly arrogates to himself the title of sculptor.

When a block leaves the cutter's hands it is generally carried on a two-wheel cart by a coterie of men and youths called "*bardeurs*," and it is raised to the required level by a crab, or some more recent engine of the kind. It is then taken in charge by the "*poseur*," who is assisted by a "*contre-poseur*." Two other workmen, the "*pinceur*" and the "*ficheur*," are close at hand, — the one wielding an iron lever, the other a metal blade with a jagged, toothed edge, — who assist respectively in rolling the block along the rising wall, and in spreading mortar or plaster between the joints. Over all these men, who cut, carry, raise, fix, joint, and ultimately mould freestone, there is a foreman, who draws, under the direction of the architect, the several constructive details to their real size either on a plastered wall or an upright surface of planks, and who prepares the templates, which are usually made of laths, although lately zinc has been sometimes employed. This man, intrusted with what is called the *tracé d'appareil* and the *coupe de pierre*, is the "*appareilleur*." He and the master-companion are the two most important officials engaged upon a French building, and they are inferior only to the inspector or clerk of the works, who is generally a young architect. We refer, of course, only to large works, for in ordinary Paris houses a clerk of the works is rarely seen. There the master-companion and the *appareilleur* take their orders usually direct from the architect or from one of his more advanced pupils. — *The Builder.*

ST. JOHN, N.B.

THE traveller who leaves Boston by steamer on a fine clear morning, and lands at St. John on a foggy evening, cannot fail to contrast the two places, much to the detriment of the latter. Nor is this difference due entirely to the fog: even in clear sunshine there is much to give one an unfavorable impression of the place. There are streets in the northern part of the town that look exceedingly "Irish"-like, — that remind one of some of the by-ways in Dublin, — places where the houses seem to have been painted only once since they were built, years ago; but age cannot be said to have rendered them picturesque. Dirty water thrown out of the houses stagnates in the gutters, and in general sanitary laws seem neglected. There are to be seen the same dirty green-grocers' shops, with windows of varied contents, as are found in towns of greater antiquity in the Old Country. You will see wonderful pieces of sculpture at shop-doors; wooden "tars," or Indians, with bundles of cigars in their hands, are frequent subjects.

The old church-yard adjoining King's Square is a shady place, enclosed by a wooden fence, such as might be found round a farmer's garden. A plain printed notice warns the visitor to "keep off

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the grass;" but if he seeks to rest, no seat will he find. Some ingenious person has sawn sugar-barrels in sections, stuck them on the top of some tree-stumps, and filled them with flowers; the wood-work painted green, to form less contrast with the surroundings — a happy idea!

The Yankee who comes here from the United States, where, as a rule, the towns and cities are orderly and cleanly kept, and some attempt is made by art to render them attractive, is struck with astonishment. Still further is he amazed when he crosses the St. John River, not in a comfortable, cushioned saloon-steamer, but in a dirty tub of a vessel, whose upper deck lets water through on rainy days — and which is badly managed no less than uncomfortable.

Of the thoroughfares, little need be said: the citizens tell me the "great traffic" at present going on explains their dirty appearance. I am a loyal subject of Queen Victoria, and would fain have given a brighter account of this part of the Dominion: yet the truth must be told.

Concerning the rebuilding, the amount done since the fire is truly marvellous. The business portion, near where the fire originated, and along the wharves, has been the first to raise its head above the ruins. Many houses, some of brick, and others of timber, are being erected in other parts.

In the rebuilding of a city, it is a matter of regret that more similarity of style cannot be carried out. Here, owing to the great rise and fall in many streets, difference in style is even more distinctly marked than on level ground. All buildings, however, are built of red brick, and nearly all are faced with pressed brick of good quality, obtained from Boston or Philadelphia, — some with freestone finish. Ornamentation in black or colored brickwork has been attempted, not always successfully; and the vile custom of putting up cornices of zinc or galvanized iron, painting and sanding them to imitate stone, has been imported here from the States. The adoption of flat roofs, covered with asphalt or tin, detracts considerably from the appearance of the buildings, rendering the sky-line any thing but pleasing.

The offices of the Western Union Telegraph Company (Mr. Merry, architect) were among the first to be built. The design is characterized by a free use of black bricks in patterns; the general opinion being, that the amount of black brick disturbs the repose of the design. On the opposite side of the street is a building of red brick, with a few panels of pure white enamelled brick which form a glaring contrast with the red.

A block of buildings erected for a Mr. Marshall is marked by care in proportion, and in the use of black brick. Messrs. McKean & Fairweather, the architects of this building, have several important works in embryo, including the Custom-House, Savings Bank, Victoria Schools, Masonic Hall, and a large block for the "Daily Telegraph."

The new Post Office has been intrusted to Mr. Stead, and will be a very appropriate design.

Messrs. Smith & Dunn are the architects for a large block of stores and warerooms in course of erection on Market Square for Messrs. Daniel & Boyd. The plans of St. Andrew's Presbyterian church by Messrs. Langley, Langley, & Burke, architects, of Toronto, are on view for the purpose of receiving tenders. The length of this building, which includes schools and vestry-rooms, is externally about 150 feet by 79 feet. X.

THE SOOCHOW PAGODA.

Now that the Porcelain Tower at Nanking exists no more, having fallen a victim to the madness of the Tai-pings, the Pih-she-t'ah at Soochow enjoys the distinction of being the largest pagoda in China. It is a fine specimen of this curious species of edifice, and of course a magnet to the traveller in this part of the world. The city of Soochow, where this pagoda is situated, is about seventy-five miles distant in a north-westerly direction from Shanghai, and is reached after a twenty-four or thirty hours' sail along the many canals that intersect the whole region hereabouts and form the universal means of communication. The city has long been famous for its wealth and splendor, the people having a proverb that "Heaven is above, and Soochow and Hangchow beneath." It was deprived, however, of much of its prosperity and beauty by the rebels, who laid perhaps the larger part in ruins. Known among foreigners as the "Paris of China," it has felt as severely as Paris has the savagery of fanaticism and mob misrule. The population has declined from a reputed two millions to barely one-fourth of that number, while weed-grown mounds, breaking the monotonous level in every direction, are mute but significant testimonies to the horrors of the Tai-ping occupancy.

There are five pagodas within the walls of Soochow, but the glory of the town is the great Pih-she-t'ah, which raises its ambitious top as if, heedless of Babel and her fate, it were striving to reach the heaven overhead. The internal plan is simple and effective. The structure is double, the inner column being filled with niches where idols sit and accept the incense of the devout. The staircases wind, in easy and comfortable stages, between the two divisions, while openings at every story to the galleries afford light and air. The floors, like the walls, are of large black brick, very hard and serviceable, and, in the more frequented passages, take a glossy and almost porcelain polish from the friction of numberless sandals. Projecting from the tower, at each floor, is a wooden gallery shaded by the peaked roofs, bell hung, which distinguish this curiosity of architecture. From these verandas extensive views of the city and environs are obtained, some very beautiful as thus seen from a safe distance.

But the galleries are shaky things, and it is safer to leave them and their views, and content ourselves with a further examination of the pagoda. Arrived at the eighth story — there are nine in all — we notice the immense beam that, founded in the solid masonry, rises far above the tent-shaped roof.

Were the pagoda in a more enlightened land, the visitor could not walk for treading on young persons selling illustrated guides; but China is not up to that point in civillization yet. In the absence of such compends of information, we gathered a few stray facts for ourselves. From the ninth story to the pavement of the court we counted two hundred and thirty-five steps. Estimating these at an average height of eight inches, we get an elevation of one hundred and fifty-seven feet to the floor of this story, which with the dome-like roof and the spire which surmounts it, must add from fifty to seventy feet more, so that the total height cannot differ much from that of the Porcelain Tower at Nanking, which measures two hundred and thirty-six feet. The diameter, as paced on the first floor, a few feet above the level of the court, was found to be about sixty feet. This dimension gradually and symmetrically lessens as we ascend, until at the ninth story it is scarcely a half of that distance. The walls are from three to four feet in thickness, built very solidly of the brick we have mentioned and a coarse cement. The only pieces of woodwork apparent are strong braces connecting the double towers, and forming a foundation for the floors and the ornamental galleries. The stability of the structure is vouched for sufficiently by the fact that it has stood a thousand years in a land of typhoons.

It is easy, at least, to say a thousand years when speaking of China, and there is evidence to prove the very ancient character of the building. On one of the bricks in the highest story is an inscription which dates back to the reign of one of the Ming dynasty, some three hundred and thirty or forty years ago. This may be taken as the era of the completion of the pagoda, but its beginning belongs to a far earlier date. It is stated as historical that its erection was undertaken by three persons, the first a viceroy, the second a private citizen who beggared himself in the work, and the third and successful patron, a Loo-Chooan prince. Another account holds that the work was begun by a minister to show his gratitude for imperial favors; but it soon consumed his property, and was completed by the emperor, who thus paid for his own compliments. How expensive he found it we have no means of knowing; but it is said that the Nanking pagoda cost more than three millions of dollars, and even at Asiatic compensation for labor, it is reasonable to consider that the Soochow tower must have cost a sum approaching this. Picturesque as the pagodas are, and greatly as they help out the landscape, it is to be regretted that pride and piety in the golden epoch of China did not take a more practical form. — *Correspondence of the N.Y. Evening Post.*

LINCOLN CATHEDRAL.

ABOUT three years ago (says the Lincolnshire *Chronicle*) some alarm was entertained relative to the state of the south-west tower of our noble cathedral. There were not wanting "evil prophets" to foretell the early collapse of the tower, together with a considerable portion of the imposing west front. These "evil prophets" asserted that the foundations had given way, that the tower had sunk to a great extent, and that consequently there were well-founded reasons for supposing that the structure was in a dangerous condition. On the other hand, there were confiding bodies who could see no occasion for fear, their satisfaction being grounded on the principle, that, as the work had stood for some hundreds of years, there need be no doubt as to its capability to withstand the storms of many years to come. Happily, the Dean and Chapter were equal to the occasion; and, being fully impressed with the importance of preserving in its fullest entirety the grand old edifice which had been intrusted to their care, they instructed their architect, Mr. Pearson, to examine the affected portion of the building, and furnish a report thereon. After carefully investigating the matter, Mr. Pearson presented a report to the Dean and Chapter, pointing out the dangerous state of the tower, and suggesting the necessary remedies. It was, however, thought by certain authorities that Mr. Pearson had overstated the danger, and that the work was in a more satisfactory state than he had described it to be. The Very Reverend the Dean thereupon called in Mr. Barlow, C. E., to view the tower. Mr. Barlow fully indorsed Mr. Pearson's report, and further added that the matter had not been taken up a moment too soon. Accordingly, the Dean and Chapter instructed Mr. Pearson to proceed with the necessary work; and he secured the services of a practical clerk of works on the spot, who immediately set to work at the cause of the disaster. An examination revealed the gratifying fact that the foundations of the south-west tower were perfectly secure. Further investigation showed that the mischief existed in the space at an altitude of between 60 and 95 feet in the tower, and that the tower itself

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was 9½ inches out of perpendicular, inclining southwards. It was ascertained beyond a doubt that the primary cause of the settlement was the bad construction of the Norman work at the point where the staircase narrows. As is well known, the towers were not originally designed to be carried to their present height, and the points at which the additions were made in the fifteenth century are easily discernible. It seems that the south-west turret was actually built upon a rubble arch, instead of a solid wall. This produced a settlement of the south wall, on account of the same not being able to sustain the increased weight placed upon it. The south wall was pierced with passages longitudinally, which tended to weaken it, and it therefore had not naturally the strength of a solid wall. Hence the settlement, which divided the wall into three portions; the two outer faces bulging outwardly, the middle portion being in the passage, and the fracture in many places was to the extent of four inches. The fractures continued to increase; and it is somewhat marvellous that the tower has kept up so long. It was also discovered that, by the settlement of the works in question, a portion of the west front was being pushed out to the extent of about five inches, and that the mischief was gradually increasing. Active operations to counteract this unsatisfactory state of things were commenced in July, 1875, and are still proceeding. An immense work of "shoring" has been necessitated; and the whole system seems to have been very carefully arranged. The works present a complete maze of timber; and it is evident that every precaution has been taken with a view to prevent mishaps, and prepare for any emergency. One thing is evident: had the work not thus been promptly taken in hand, an "avalanche" of the south-west turret might have been looked for, in which case the loss, in an architectural sense, would have been a national one, and, at the same time, probably the lives and limbs of some of her Majesty's subjects might have been sacrificed. As it is, the action of the Dean and Chapter promises to give stability to the noble pile, and to hand it down to posterity in as perfect a state as possible. The work will necessarily take a considerable time before it is completed; but it is being prosecuted in such a manner as to leave no doubt that it will be brought to a thoroughly satisfactory termination.

NOTES AND CLIPPINGS.

STRIKE OF PLASTERERS AT BROOKLYN. — The plasterers and skilled laborers — numbering about one hundred — left their work on new Municipal Building, Brooklyn, last week, having struck because of the reduction of their wages. The brothers Thomas and William B. Lamb took the contract from the Brooklyn city government to erect that building, and then sublet it to Thomas B. Watson, a builder and plasterer. From the latter the plasterers have been receiving two dollars and fifty cents a day, and the laborers two dollars. They were notified that a reduction of twenty-five cents a day would be made in their wages; and a meeting of the Brooklyn Plasterers' Union having been held, it was decided to refuse to accept the new scale of prices. This is the third or fourth strike that has occurred among laborers on the new Municipal Building.

STONE FOR THE CHICAGO COURT HOUSE. — Great quantities of building stone are now being shipped from Blue Hill, Me., to Chicago for the new court-house; and there is but one handling of the stone between the quarry and Chicago.

THE GEORGIA STATE HOUSE. — Atlanta renews the proposition to give City Hall Square and build a capitol as good as that in Milledgeville, if it is selected for the capital.

THE INDIANA STATE HOUSE. — It is expected that about seventy-five designs for the new State House at Indianapolis will be submitted in the second competition.

IMPROVED SEWERAGE AT BOSTON. — The committee on Improved Sewerage have awarded contracts for the several sections of the sewer for which proposals were recently received. W. L. and Bruce Hoblitzell of Baltimore were the lowest bidders for section one, but subsequently withdrew; and the contract was awarded to P. J. Conlon of Jersey City, whose bid was $37,735. The same party also received the contract for section two for $33,705. For section one on Stony Brook, Miles Tierney received the contract for $25,255; and the South Boston section was awarded to Stephen Connolly & Sons for $21,622.40.

THE PEORIA, ILL., COURT HOUSE. — It is said that the Board of Supervisors have by a vote of sixteen to seven discharged the architects of the court-house, Messrs. Wilcox & Miller; the action being based on the minority report of the committee which was appointed at the instance of Mr. Wilcox, to investigate the charges which he had made against the contractors.

HEATING CITIES BY STEAM. — A company has been incorporated in Columbus, O., with a capital of $150,000, which states that it is ready to furnish steam for heating houses and running machinery in any part of the city.

DEEP BORING AT ST. LOUIS, MO. — In boring the artesian well at the Insane Asylum, St. Louis, the auger penetrated 3,800 feet, going through 200 feet of coal measures, 500 feet of sub-carboniferous limestones, 1,000 feet of Devonian, and 2,000 feet of upper and lower silurian, and in the bottom cut a brown ferruginous sandstone, supposed to be of Potsdam age.

HOUSE MOVING EXTRAORDINARY. — An Oswego County (N. Y.) man lately moved his two-story house on a train of four platform-cars from Sand Hill to Pulaski.

A CHANCE FOR FEMALE CARVERS. — Mr. Reuben E. Springer, who has given the city of Cincinnati a music hall and an immense organ, has given $500 in gold, divided into ten prizes, for the best designs in carving for the case of this instrument. The competition is open to all American women.

ACCIDENT TO A BRIDGE. — At twelve o'clock on the night of Oct. 6, the western abutment to the great iron bridge that spans the Missouri at Atchison, Kan., caved into the river, carrying the entire fifteen-foot wall and about seventy-five feet of embankment. A gradual sliding of work had been noticed for the past forty-eight hours, and Mr. L. L. Todd, superintendent of the bridge, had a force of men employed day and night, doing every thing that could be done to avert the disaster. A force of men had been at work tearing off the wall all day, that the long draw span might be cleared, and escape the danger that threatened when the wreck should come. They succeeded in swinging the draw clear at ten o'clock. At twelve o'clock the huge mass of masonry, and thousands of cubic yards of earthwork, the office and bridge approach, were hurled into the Missouri River. The damage has been confined exclusively to the abutment, and every thing else is safe.

A NEW OPERA HOUSE. — A new opera-house was opened in Leicester, Eng., recently. The building cost about $175,000.

OUR TONS. — "Could any thing be more absurd than our tons?" says the *Engineering and Mining Journal*. "In a copper works, for example, ore is measured and paid for by the (tribute) ton of 2,352 lbs. from the mine through the mill, till it comes out of the jigs, when suddenly it is transformed into a ton of 2,240 lbs. (the difference, perhaps, going out in the tailings), which is the ton of the roasting and smelting furnaces and of the teamsters. This continues till the copper is sold or carried over some roads, when the ton shrinks again and becomes 2,000 lbs. At the iron works there are still more tons, different from these; and on the railroads one will report the coal carried in tons of 2,240 lbs., and another connecting road uses the ton of 2,000 lbs. And in order to maintain the beautiful symmetry of our system, they of course rarely, if ever, state what kind of a ton is used in either case. Coal is mined and miners are paid by tons of various weights from 3,000 lbs. to 2,000 lbs. It is sold by tons of 2,240 and 2,000 lbs., and by tons running down all the way to 1,500 lbs. The use of the ton less than 2,000 lbs. is called cheating, but the large purchasers, those who buy from a car-load (6 tons) up, may get 2,240 lbs. to the ton; but if they buy from the same company's retail yard, they find the ton weighs no more than 2,000 lbs., if it does that. Coal is sold by bushels of 76 lbs. and 80 lbs., by barrels, loads, hogsheads, and other 'standards,' the weights of which depend originally on the fancy of the individual, and subsequently on 'immemorial custom.'"

AN INGENIOUS PRISON LOCK. — Mr. George Page of New Haven, Conn., who has invented a number of important improvements in locks, has completed a model of a lock for cell-doors in jails and prisons. This lock cannot be opened by a prisoner in his cell. There is one key-hole, as in any other lock. A little to one side of it appears a hole cut through the iron plate of the lock, back of which are movable plates which are of different colors — white, red, and black; and it is by an observation of these plates that the governor of a jail sees at a glance just how much a prisoner is locked up. By a spring in the edge of the lock it is made to effectually seal the door when a prisoner is placed in a cell, without the need of using any key. The turnkey, however, has a key, and on locking the door the little movable plate shows red. If all the cell locks exhibit the red movable plate, an inspector knows that every lock is closed. The governor of the jail, or some person in superior authority, has a master-key which fits into the same key-hole. He goes around the last thing at night, inserts his master-key, and, after it is turned, the red show-plate is automatically changed for a black one. When so locked, the turnkey cannot unlock the door with his key; he must wait for the governor of the jail to use his key. The idea is that though a keeper may be bribed, it would be harder to bribe the superior officer. If any prisoner should succeed in unlocking the lock of his cell, the pushing back of the lock-bolt starts off a loud bell-alarm concealed within the lock.

THE GREAT WALL OF CHINA. — The Great Wall of China was measured in many places by Mr. Unthank, an American engineer, lately engaged on a survey for a Chinese railway. His measurements give the height at eighteen feet, and a width on top of fifteen feet. Every few hundred yards there is a tower twenty-four feet square, and from twenty to twenty-five feet high. The foundation of the wall is of solid granite. Mr. Unthank brought with him a brick from the wall, which is supposed to have been made two hundred years before the time of Christ. In building this immense stone fence to keep out the Tartars, the builders never attempted to avoid mountains or chasms to save expense. For 1,300 miles the wall goes over plain and mountain, and every foot of the foundation is in solid granite, and the rest of the structure solid masonry. In some places the wall is built smooth up against the bank, or cañons, or precipices, where there is a sheer descent of 1,000 feet. Small streams are arched over, but on the larger streams the wall runs to the water's edge, and a tower is built on each side. On the top of the wall there are breastworks, or defences, facing in and out, so the defending forces can pass from one tower to another without being exposed to any enemy from either side. To calculate the time of building, or cost of this wall, is beyond human skill. So far as the magnitude of the work is concerned, it surpasses every thing in ancient or modern times of which there is any trace. The Pyramids of Egypt are nothing compared to it. — *London News.*

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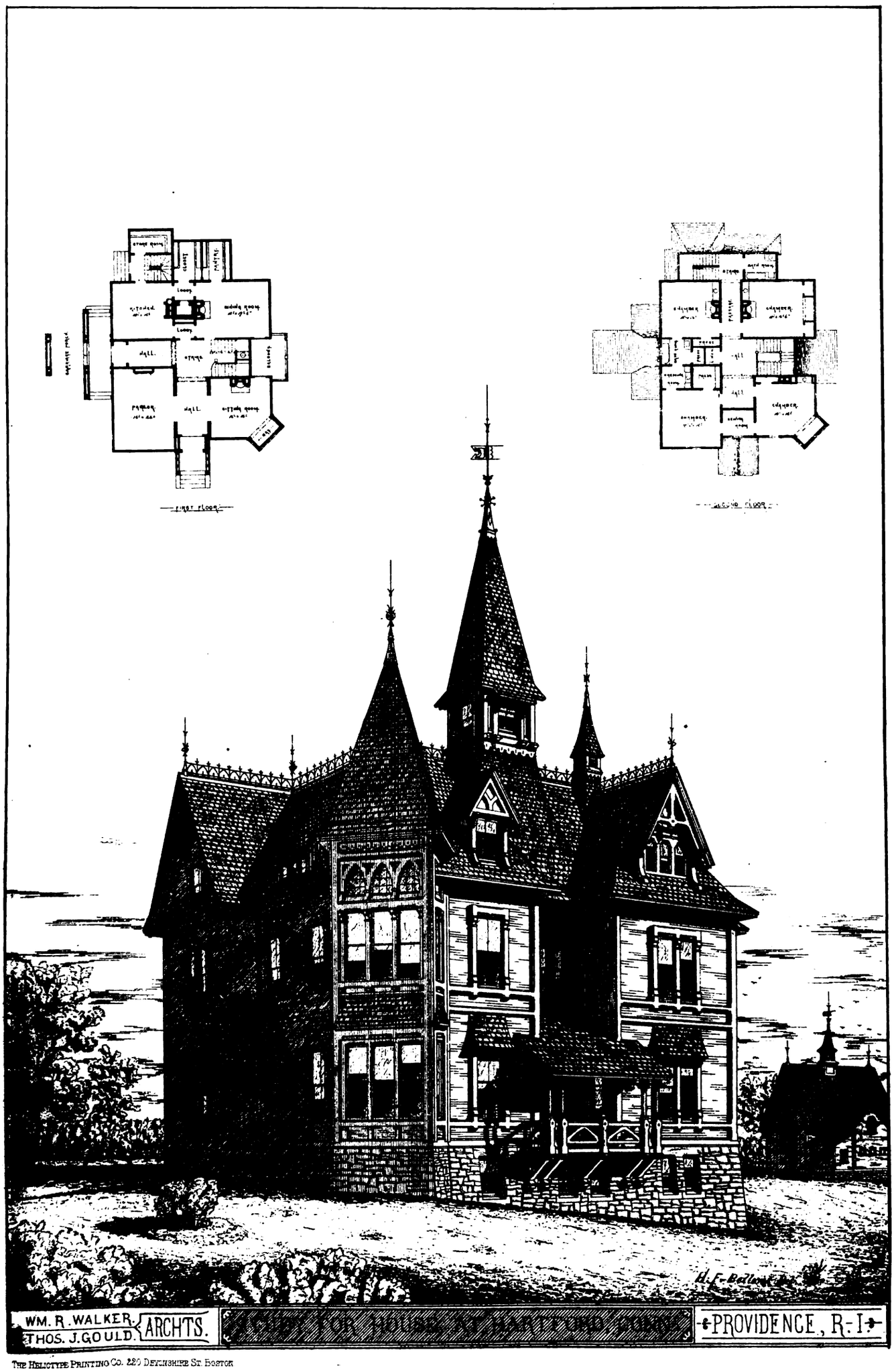

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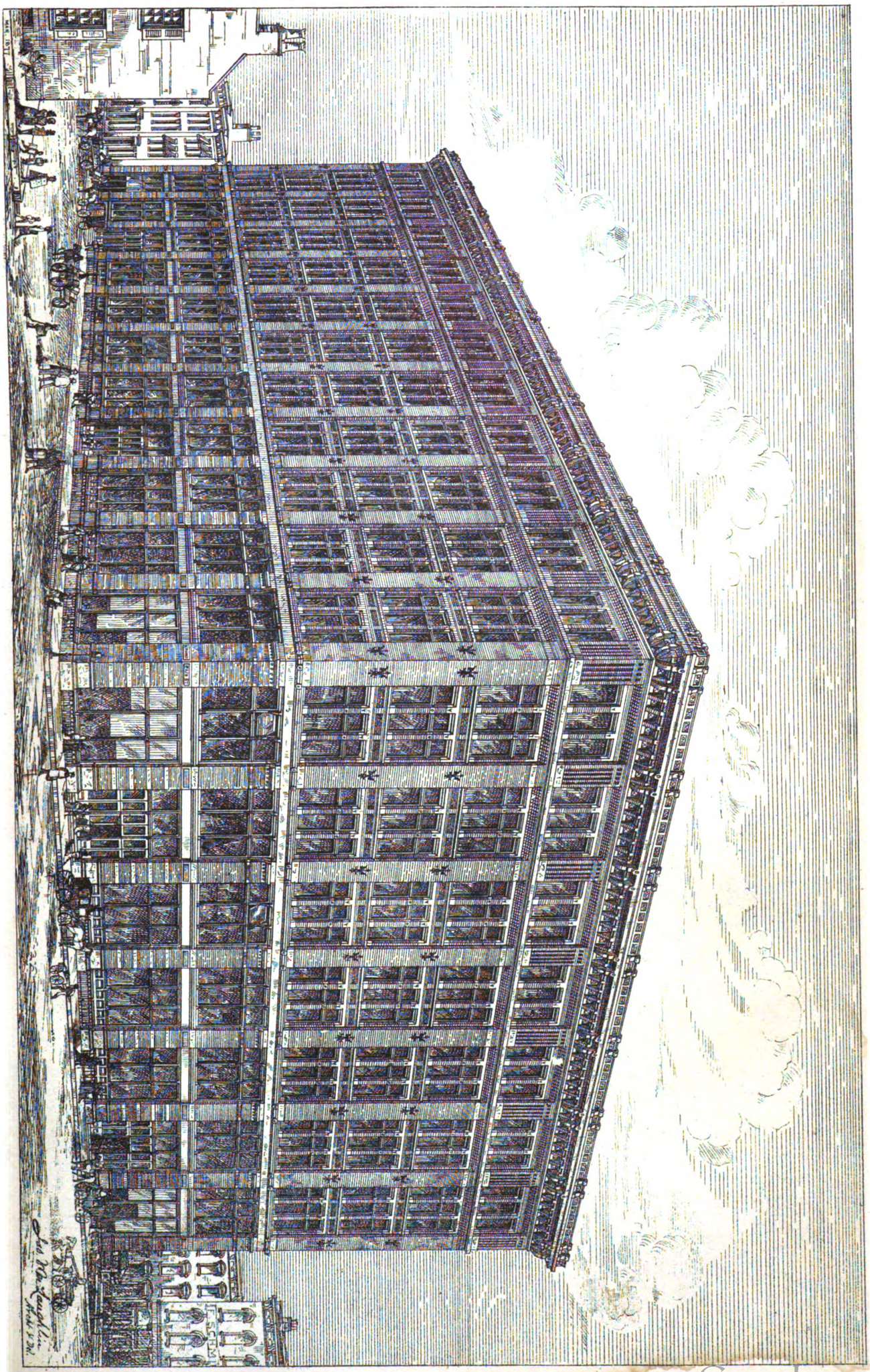

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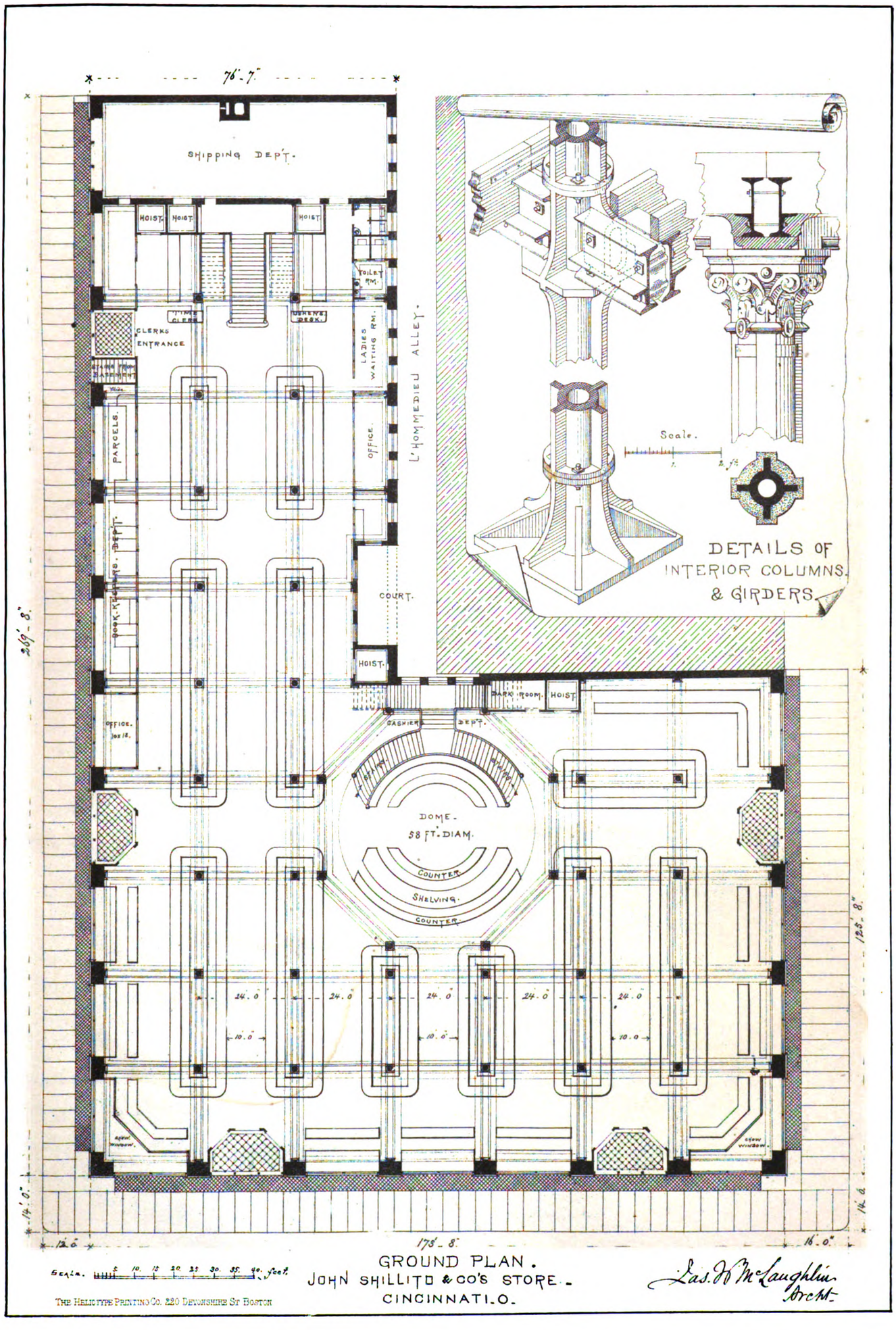

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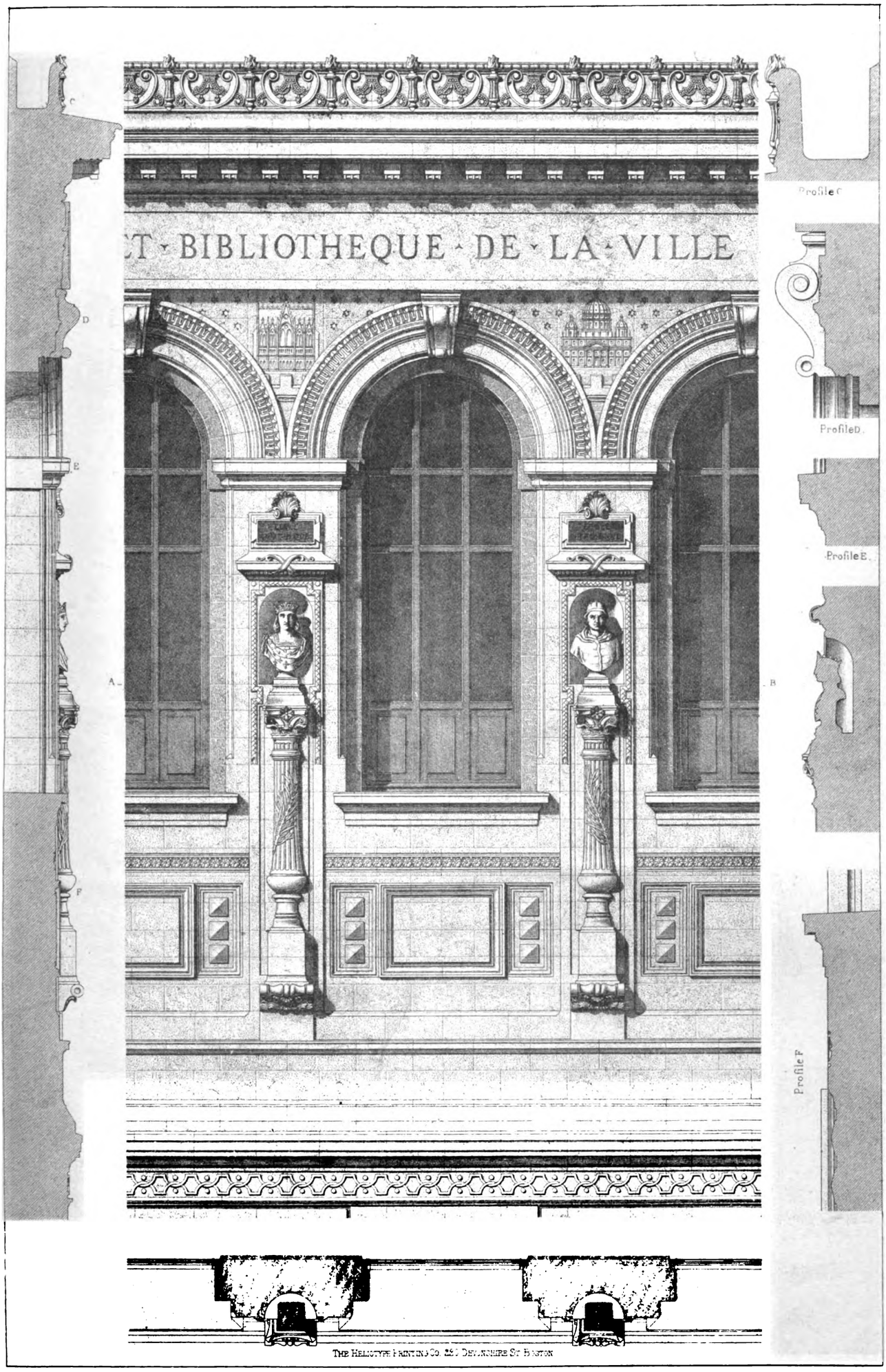

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DETAILS FROM THE FAÇADE OF THE SCHOOL OF FINE ARTS, AT MARSEILLES, FRANCE.
M. ESPÉRANDIEU ARCHT.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, OCTOBER 20, 1877.

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A MEETING was held last week in New York at the rooms of the Board of Underwriters, to urge the representation of American manufactures at the French Exhibition of 1878. A National Executive Committee was appointed, including many prominent names from various cities; Gen. Joseph R. Hawley was chosen President, Mr. A. T. Goshorn first Vice-President, and Mr. August Belmont Treasurer, though of what does not appear very clearly from the accounts that have reached us. Some diversity of opinion was developed at the meeting. A majority report from the committee on resolutions proposed a permanent association to be called the New York Exhibitors' Union of the Paris Exhibition, and urged that the officers who had been chosen should press upon Congress the need of an appropriation to aid exhibitors. A minority report recommended an adjournment for a week, during which a committee to be appointed at the meeting should go to Washington to urge the acceptance of the invitation of the French government to join in the Exhibition, and "proper provision for our representation there." A part of the meeting was in favor of carrying on the movement by private organization, with the aid of Congress if it could be got; if not, without it; and apparently with no concern for the attitude of the Executive in the matter. One Boston gentleman reported that there were at least a hundred establishments in his city that proposed to exhibit in any case. Another part advocated an appeal for official indorsement from the Government, and a formal acceptance by it of the invitation of the French government. Mr. Coudert, the chairman of the meeting, thought the failure of support from the Government must end the matter; but while he deprecated the delay of the Executive, felt assured of the favor of the Secretary of State, for the Exhibition, and hoped for a proper official support. The minority report was finally adopted, and the chairman of the meeting was directed to appoint a committee who should lay the matter before the President.

THE French Exhibition, like all the European exhibitions, but unlike our Centennial, is a government undertaking; the invitation to take part in it is from the French government to ours. There has been a notion that the backwardness of our Executive in responding to the invitation is due to a French official at the Centennial, who wrote and published a very discreditable private letter about our people,—a notion for which there is probably no foundation. If we remember rightly, the letter was reprehended by the French government, though, as it was not official, there was no occasion or opportunity for disclaiming it. That the United States should be represented, and well represented, at the Paris Exhibition, seems to us extremely important. The lessons of the Centennial are beginning to bear fruit in an improvement of manufactures all over the land; it needs the stimulus of another exhibition and a new opportunity of comparison to secure the full benefit of it. We do not know what individual exhibitors might succeed in doing; but we are sure that there will be no creditable display from us without action from the Government. We have not shone in European exhibitions thus far. There were many things, official and unofficial, at the Vienna Exhibition, that did us no credit; but they may be avoided this time, and absence would be a calamity. We do not believe that our Executive is likely to imitate the churlish example of Germany in refusing the French invitation; still less, that it will offer the affront of letting it go unanswered. But before it is accepted, there ought to be indication that the manufacturers of the country mean to do us credit, and of a disposition on the part of Congress to do the right thing for the occasion.

WHILE many interesting experiments on the utilization of sewage are going on in Europe, the question of its profitable and safe employment must be regarded as still undecided. In some cases, particularly of smaller towns, a large measure of success is claimed for various processes of irrigation or desiccation; but in the large cities the case is more difficult. In Paris, for instance, where the sewage of a considerable section of the town has lately been diverted from the Seine, and diffused by irrigation over an adjacent district, the experiment which at first seemed successful now looks more questionable; and the commune of Gennevilliers, where the sewage was delivered and spread over the fields which it was expected to fertilize, some time ago sued for an injunction against the city on the ground that its territory was being poisoned by the contribution. Meanwhile the crying necessity is to get rid of the organic matter that accumulates in cities; and in New York, as we have mentioned before, a plan has been on foot for disposing of the street garbage by burning. The Police Commissioners have made a contract with the Metropolitan Refuse Company to dispose of the street dirt of the Seventh Ward; and the experiment has been going on for three weeks. By this unsavory process which the newspapers delicately call "cremation," some seventy loads of refuse are burned each day. The gases evolved are consumed, it is said; and the residuum, from five to twenty per cent, is said to be fit for "filling, roofing, roadways, or ballast." It is not difficult to believe that in a powerful furnace all noxious organic matters would be thoroughly decomposed; whether the gases into which they would resolve would not become noxious in their turn would depend, we take it, on the completeness of the combustion. We are told, however, that people in the neighborhood of the furnaces make no complaint of them. It is hoped that if the experiment succeeds, arrangements will be made for disposing of all the garbage of the city, for which it is proposed to build six blast-furnaces of thirteen feet diameter, and sixteen feet high, which can dispose of a thousand loads a day. At present it is said to cost the city five hundred dollars a day to tow the refuse out and dump it into the sea; a proceeding which is in itself at least questionable. Mr. Foote, the patentee of the process, thinks that it can be made to pay for itself; and says that he has been offered twenty cents a load for all the residuum he can deliver. We should think that till the result had been pretty thoroughly tested it would be as well for the city to have an eye to the use that is made of this residuum, especially as the amount of it, and therefore the profit, will increase directly with the imperfection of the process.

WE read with some amusement a letter to the New York *Tribune* from an American engineer, who is in patriotic alarm at the proposal that Cleopatra's Needle shall be brought to this country by the English engineer who is now moving the Wilson obelisk to London. "The point is simply this," he says: "If we allow a thing of the kind to be done by foreigners, the implication will be that we could not do it ourselves. This is not true; but if we allow it to appear so, we shall certainly have to stand the implication." There is not much danger that anybody who thinks of American engineers at all should imagine them incapable of such a task, especially considering how many times it has been performed. If the transportation of needles of such a gauge were to become an important branch of business, it might be worth an effort to secure a share of it to our country, especially considering

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the depressed condition of what the newspapers call our mercantile marine. But remembering that the occasion is not likely to occur again in this century at all events, we cannot think that another such craft as Mr. Dixon has prepared would be a great addition to the number of "American bottoms;" and we should say that the only important considerations in this case were security and economy. Of course security is by all odds the most important consideration. If an American should offer a scheme of transportation which obviously promised greater security, or, with equal guaranty of success, a considerably less cost, these would be reasons for putting the work into his hands. But assuming equality of skill, as we may between English and American engineers, the presumption of success, so far as it went, would be in favor of the person who has gained experience in moving the Wilson obelisk, if he succeeds, or perhaps even if he fails. It can hardly be said of Mr. Serrell: *rem acu tetigit*. One tires of hearing appeals to patriotic pride in cases with which patriotic pride has nothing to do.

WE have spoken more than once of the new Society of Decorative Art in New York, a ladies' society, in which judicious management and liberality of plan have been conspicuous from its beginning. It has just opened for the first time its salesroom at No. 4 East Twentieth Street. The society offers for sale not only the things made in the schools which it has established, but decorative work of any kind which may be sent to it by the maker, provided only that the committee on admissions consider it to be sufficiently good. This opening of a market to which anybody can offer his work without having recourse to the dealers, and in which only the moderate commission of ten per cent is charged to offset the expenses of sale, ought to be of great benefit; and the wisdom of the managers in not restricting it to women's work is manifest. The provision that the things offered shall be on approbation, is of course indispensable if the association is to have any influence; and this is the only restriction that is established, except that those that send things shall pay for transportation. The work of the association is already well organized and begun. Lectures on various industrial arts have been arranged, and auxiliary committees have been formed in other cities. Classes for instruction have been begun, mainly on the South Kensington plan, in needle-work, lace-work, china-painting, and pottery. The association has no fund, and fees are necessarily and properly charged for instruction; but a free class has also been established, the members of which are expected to give two or three hours' work each day to the association in return for what they receive.

AN association of like aim has been formed in Boston to establish a school of wood-carving for women, such as has been so successful in Cincinnati. A committee of ladies and gentlemen has been appointed, and a subscription set on foot. As soon as money enough is secured, a systematic course of instruction will be set going, with lectures and classes in modelling and carving. A skilful modeller and ornamental sculptor, Mr. John Evans, has been engaged to take charge of the classes. Apropos of sculptors, Mr. Ralph Dengler, a young sculptor of Cincinnati, has been engaged to take charge of the new class in sculpture that has been added to the new School of Drawing and Painting in Boston, so that the school is now complete in all its branches.

THE strike among the masons in London has brought the work on the New Law-Courts there to a stop. The contractors, Messrs. Bull and Sons, had provided for this occurrence, from which no large work in England can be expected to be secure at this day, by getting a clause inserted in their contract which allowed them six months' grace in case they were interfered with by strikes. It is questionable whether even this will make them whole, if we may judge by what we read. When the work was stopped they immediately sent to Germany for masons to take the place of the strikers. Two dozen men arrived a short time ago, and were set to work at once; but on the third morning they were missing. The foreman hastened to the inn where they lodged, and found that the whole company had taken their breakfast early, hurried down to the Hamburg steamer, and were on their way back to Germany. Their striking brethren of London had got at them, and paid their fare back to Germany, and they had decamped without a word to their employers. The strikes are growing into a national calamity. The waste and hardship are enormous; the conflict bids fair to become the important political movement of the day in England. The *British Architect* says: —

"Carpenters in Manchester, and masons in London, thousands of good workmen out in the cold! *On strike.* Absolute suffering and discontent for the men, and inconvenience, loss, and trouble for the masters; to be continued during the whole miserable existence of a trial of strength called 'a strike.' And this wretched injustice to masters and men, this strike, is the only way in which the problem can be solved in the nineteenth century. It is simply a question of fighting, just as the Russians and Turks are now doing. The nineteenth century settles national and economic questions by fighting! Its wisdom cannot settle them, and certainly its temper and disposition cannot. And so this lengthy, unjust, and temporary method of fighting must be carried on. It is lengthy; for the masters, — a mere question of capital; for the men, a question of their unions' capital and the capacity of their families and themselves for bearing suffering and trouble. It is unjust, for might will win, and might is *not* always right. It is temporary, for let the weak revive into strength, and then — fight again! One conclusion we form is this: Trades unions are much to blame. Masters know what they *can* do, and what they cannot. It is for unions to obtain facts, and judge fairly and honestly of the possibilities of the case, and then effect an arbitration; write, talk, argue, work the rights of the thing until a fair arbitration is brought about. Trades unions exercise a mighty power. It should be wielded rightly. If aiming to make workmen efficient, and to obtain the best pay for the best work as a primary object, they would be a greater source of good, and afford less of a comfortable sneaking-place for idle and incompetent workmen. Generally masters are fair and reasonable, and have sufficient education and intelligence to pay a really good price to a good workman, with the knowledge that it pays so to do. Would that the relations of men to their masters were solely those of friendly commercial competition, and not of such a bitter, fierce, and resentful character!"

THE tenth annual Congress of the English (or perhaps the British) Trades Unions has just been held in Leicester. It had an interest for outsiders because of the moderate tone it assumed, if we may judge by the inaugural address of its president, Mr. Merrick, which seems to have been received with much favor. After properly denouncing attempts upon property or persons, Mr. Merrick said that the motto of trades-unionism was, "United to protect, but not to injure." Strikes and lock-outs, he thought, were barbarous devices and relics of the spirit of a past age, than which some better means of settling differences might be devised; and the means that he urged was arbitration, which had grown greatly in favor during the last few years. Workmen, he thought, had nothing to fear from either arbitration or publicity. It was generally found that the awards of arbitration boards could be trusted; and he cited instances of the readiness of workmen to invite and abide by them. He considered trades-unions important, because they made the men thoughtful, and encouraged the habit of saving. These are more reasonable words than we are used to expect from the trades-unions; how far they indicate the real tendencies that are active among them now, we cannot judge: it is not unlikely that the unions, like other leagues, political or social, are ready to talk more reasonably than they will act. They have doubtless been formed, as the president says, for the purpose of protection, though their chosen means of protecting themselves has been injury, and often violent injury, to other people. But when they find that this means of protection, which at first had the effect which is due to an audacious surprise, is losing its efficacy, that the strikes of the men are being offset by the concerted measures of the masters, and that the communities are slowly but certainly rousing themselves to lay a heavy hand on unions that violently trouble their peace, it is not strange that those unions should begin to see the wisdom of substituting reason for a violence that is becoming ineffective. It is not easy, however, to go with Mr. Merrick in his assertion that the unions have made workmen self-reliant and saving. The evidence is rather that they tend decidedly to idleness, which means wastefulness; and as to self-reliance, it looks to an outsider as if submission to employers had simply been changed into servility to their own rulers. Meanwhile the strikes of colliers and shipwrights in the north, and of the Manchester joiners, still go on; the last, by the way, was met in the beginning by an offer of arbitration from the masters, which was rejected by the men.

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PROFESSIONAL ETIQUETTE.

IT is natural that professional etiquette should be more or less a matter of dispute, and should be looked upon with more or less of impatience, both by clients and by that part of the profession whose concern is only for the success of the moment. Etiquette, professional or social, is a restraint to the natural impulses of persons who are not accustomed to it, — this is the very purpose of its existence; and people do not willingly submit to restraint unless they either have been born to it or have deliberately imposed it on themselves. That the etiquette of a new profession like architecture should have to make its way, or to be put forward, through some opposition, is not to be wondered at; and indeed, is perhaps desirable, for so it may be prevented from becoming oppressive and domineering, and the restraints it imposes from overbalancing the benefits to be gained from it. Now the economical advantage of a professional etiquette, the one by which therefore it must in the present age chiefly swear, is that it saves us from the loss of time and expenditure of effort, which come of disorderly strife. This is to any profession a matter of very great importance. The waste of force that goes on when its members are struggling to get the advantage of one another, or to resist the aggressions of an inconsiderate *clientèle*, is enormous. It exhausts the energy, the interest, or at least the time of the practitioner, and it impairs the quality of his work. There are clients with whom it is a matter of course to beat down the charges of every practitioner they employ to the lowest possible point, as they would haggle with a huckster for fruit. There are also Ishmaelites in every profession; born cut-throats, whose hand is against every man, who live by strife, and are comfortable in no other element. The field of architecture in the United States, open as it is, with no barrier at which anybody's right to enter it can be disputed, seems to be peculiarly tempting to adventurers; and there is no end to the confusion they make in it. But most architects acknowledge the harm that is done, the time wasted, and the demoralization caused among them, by unregulated efforts to get the better of each other, or by the desire of unreasonable clients to get the better of architects; by all the uncertainty and random effort that is due to not knowing what they have to expect from each other.

Of course, theoretically, the substantial benefits of a code of etiquette could be secured without it, by the use of individual fairness, courtesy, and common sense, if these always prevailed; and there are those who in good faith think that these are enough to trust to, just as there are those, on the other hand, who think it as well that every one should be left to work his way along by incessant fighting. But we know very well that the pressure of competition is directly against courtesy and fair dealing; that the hurry of rivalry may greatly warp our ideas of propriety away from our quiet judgment; and that for men to count on each other's doings under such influences, unrestrained by custom, is simply impossible. The choice is simply between a condition of constant strife and lawless confusion, in which half the energy of a profession is wasted, and which brings mostly to the front, not those who are professionally best qualified, but the best fighters or wire-pullers, and a condition in which the dealings of practitioners with their clients, and with each other, are determined by known and orderly agreement; where the efforts of the profession are spent in their legitimate work; where the practitioner has a reasonable assurance that excellence will not be robbed of its reward, and the public may believe that prominence means merit.

The etiquette whose office it is to defend architects against these troubles is plainly the care of the architects themselves. It must be they who determine it, establish it, and maintain it — under correction of experience. Architects are too apt to forget this, and to complain that the profession does not have the treatment it ought to have from clients and the public; that competitions are offered on unreasonable and humiliating terms; that clients try to restrict them in their professional authority, or of their due remuneration; that the public does not treat their guild with proper deference, or show due respect to its expressed opinion, or give proper precedence to its authority in its own domain. All this is in a measure true. The average citizen does not hold the architect's opinion, even in the things of his vocation, as better than those of his carpenter or house-painter; the public does expect him to waste his time and money on competitions that do not pay, and are not intelligently, often not honestly, decided; the client does often urge, and if he can, constrain him, to work for unremunerative fees. More than this, the architect does sometimes cut his brother's throat; he intercepts the work that would fall to him by offering to do it for a less fee, or by gaining the ear of client or committee-man. But it is of no use for architects to waste their breath in complaint at these things. The etiquette that would control them is their defence. No one else can be expected to champion it, and no one else will. Nor is there need of any one else. The individual architect, wanting his daily bread and unsustained by his fellows, may be at the mercy of the public or the client; but the profession is not. It has come to be recognized as necessary, and it can make itself indispensable. Whatever rules of practice or etiquette it stands upon, within the bounds of reason, it can maintain. If it fails, it is not the fault of the outside world, but its own. It has no right to complain. A profession always maintains its etiquette, in the face as it were of the public, which naturally pays it no more heed than it is compelled to, and regards it mostly as an irksome impediment in the way of treating individual practitioners with all the freedom that it chooses. From the point of view of the public, it is a code of defence; from that of the profession, it is a code for the regulation which restrains the members from interference with each other, and from sacrificing the general welfare by working against each other. Naturally such an etiquette is not established till a profession has become somewhat united. Its development shows how far the members have learned the mischief of antagonism, and the need of common agreement, the value of having a professional vantage-ground maintained by common action, instead of being obliged, each one, to conquer every position from the very beginning by pure self-assertion. It is in fact a sign of civilization preferred to barbarism.

It ought not to be necessary, one would think, to enlarge on the value of a reasonable deference to etiquette in any profession; but it is certain that, on the whole, American architects are greatly disposed to undervalue it. The Ishmaelite abounds in the profession; and its rules, well established by the usage of other countries and accepted in this, are made conspicuous too much by their exceptions. Yet it is a profession in which unity of action is of great importance to progress, and still more to the appreciation of the public. How far the condition of active progress and public respect are apt to coincide with a care for etiquette, we may learn from the physicians; of the union of uncertain progress and doubtful repute with an irregular practice, our own profession is a good example. There is, to be sure, an astonishing difference in the susceptibility of architects. One will accept or even invite treatment which another will resent as indignity. There are those who seem utterly careless of the claim of their profession to any respectful treatment whatever; and there are those who would exact an amount of deference and formality that would seriously impede the public in obtaining what it needs from us.

As regards the public, the fixing of a professional etiquette is a compromise between the proper dignity and freedom of the profession, and its pliability to its requirements or desires. When fair and honorable dealing have been provided for, there remains the test of what will, in the long run, best suit the interest of the community; for architects must not forget that the real interests of the community are the real interests of their profession. It is for the general welfare that architecture should attract men of character, ability, and acquirement; that it should give them encouragement to do their work well, and an adequate remuneration for it; and also that they should respond as directly and easily as possible to the wants of the community. While the care of maintaining a defensive etiquette belongs to the profession, and they do ill who neglect or invalidate it, it still behooves them to see that they do not press it to the permanent inconvenience of the public. Questions of compromise are always difficult and seldom to be determined except by experience. But it does architects no harm to remember, that while they have the right, and in a considerable degree the power, to fix the terms on which they will do service to the community, it is nevertheless for the sake of that service, and for that only, that architects exist.

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CAST-IRON FRONTS AND THEIR DECORATION.

IT is quite natural that we should feel a strong predilection for those time-honored materials, stone, wood, clay, which have served mankind so well since the beginning of the world, — materials which have formed all the great styles of architecture now known to us. Yet, though necessarily sharing this feeling with the rest, I believe that, if allowed to become too predominant, it will stand in the way of our availing ourselves of the resources at our command, and thereby retard the healthy development of a better style of architecture. I believe that it is a sentiment which, together with our inartistic treatment of cast-iron, has given rise to remarks against the material, often so ill-placed and unjust as to have produced a general misconception of its capabilities. To devote therefore a few words to the attempt of removing this misconception where it exists, seems reasonable and right.

If in the treatment of our iron fronts, we have so far failed artistically, this does not in the least affect the question of the adaptability of cast-iron for exterior use in building. If its use is found to be economical, its proper artistic treatment must follow sooner or later.

The value of any building material must be determined by studying either its popularity as shown by the extent of its use, or its capabilities as compared with those of others in use. In the present case our experience has been so short that it is hardly fair to form our estimate from its popularity. Yet, so far as we can learn, the verdict is decidedly in its favor.

The use of cast-iron in the manufactures does not appear to date back beyond the invention of gunpowder and the consequent casting of cannon in 1327.

The first instance on record of its successful application for building purposes was in the beams of a cotton mill in Manchester, England, in 1801, or within the life-time of many of our friends.

For exteriors, its use is in its infancy. The first iron front erected in America is said to be that on the corner of Duane and Centre Streets, New York, built in 1847.

What has been accomplished since that time by us Americans does not seem sufficient to justify any very wild enthusiasm on the part of the artistic world. Indeed, our typical iron front is the embodiment of all that is vulgar in American architecture, so that the very name has to many of us become offensive.

I believe the cause of this to be that the material is new, and that we therefore have no models to copy. The problem before us then is nothing more nor less than the invention of a new style of architecture.

Its difficulty however does not appear to have troubled the Yankee builder. "What has he to do with the knotty problems of art?" he says, and proceeds to turn out expensive imitations of stonework, in such numbers that if those in New York alone were ranged in a straight line side by side they would reach from the City Hall to Union Square, or a distance of over two miles.

That this imitation involves great waste is overlooked by the owner, who is satisfied if he gets, for comparatively little money, the appearance of stone without its substance. But it is evident that when the forms of one material are imitated in another totally different in its nature, either a loss of strength or a waste of material is the inevitable result.

The spread of iron fronts within the last fifteen years, notwithstanding the prejudice against them caused by their unhappy treatment in design, has been astonishing; and their power of resisting fire and climatic influences has commended itself to all. One of the surest indications of the popularity of the iron front is the fact, stated on good authority, that after the great Chicago fire, every owner of iron stores who was burnt out — the iron fronts, where injured, being thrown down by the falling of adjoining walls rather than by the fire itself — rebuilt in the same manner.

Comparing next the material itself with others, we are obliged to admit that cast-iron occupies in many respects a place inferior to none.

Its *strength* is greater than that of any other material used in building. The tensile strength of the best cast-iron is stated as over 11 tons to the square inch of section, its crushing strength as over 70 tons to the square inch, or 20 or 30 times as great as that of ordinary building stones. It is calculated that a cast-iron column may be ten miles high before it will crush itself by its own weight.

Its *durability* depends upon the care with which it is kept; but painted once in three or four years, it is apparently indestructible, while stone blackens and decomposes in the air. It is said that rain-water, after washing a marble front will be found by chemical analysis to be so fully impregnated with carbonate of lime, as to be useless for the purposes for which soft water is applied.

Its *economy* in mercantile buildings is proverbial. Mr. Fryer in his practical work for iron-workers says, "The interest on the difference in the first cost between a stone and an iron front will easily pay for one coat of paint a year." Yet once well painted and boiled in oil, an iron front will sometimes look well, in places where the exposure is not trying, for ten years without a renewal of paint.

Its *noncombustibility* or power of resisting fire is, especially when backed up with brick-work, greater than that of any other known material or combination of materials unless we except terra-cotta.

Experience in the two most important fires we have known within the last fifteen years, fires in which iron fronts were fairly tested, forces us to this conclusion. Brick-work used alone will crumble or be beaten to pieces by falling walls; but protected by a solid boxing of iron, as in piers, it is practically indestructible. A most striking instance of this was shown after the great Boston fire. Wandering about the ruins on Federal Street I came to the spot where the store of Huzzey, Wells, & Co. had stood. The piers of the first story were of iron backed with brick-work. It was these that attracted me to the spot. All around them for a great distance the destruction was absolute. The force of the fire seemed to have been in this neighborhood particularly terrible. Every thing seemed to be reduced to a powder and levelled to the ground. Granite was split up in fine pieces, and bricks literally crushed to atoms. But in the centre of all this desolation stood these iron piers uninjured. They were hurled off of their foundations, it is true, by the falling walls; but their edges were quite straight and sharp, and their condition nearly perfect. The iron had held the brick-work in its place, and reciprocally the brick-work had cooled the iron, and prevented it from twisting.

The *lightness* of iron is, in consequence of its strength, superior to that of any other material excepting wood; and in many cases, even wood itself cannot compete with it.

A notable instance of this is the cast-iron spire of the Rouen Cathedral. This spire was designed to take the place of the wooden one destroyed by fire. Though its dimensions were greater than its wooden predecessor, its comparative weight, as I was informed by the supervising architect, was estimated at only one-half.

As for the *beauty* of cast-iron, its natural unpainted surface is never supposed to be visible. Painted, it is equal to painted wood, or even, for that matter, to Pentelican marble itself when treated with color as your interesting articles on Greek polychromy show us to have been customary with the ancient Greeks. Those masters of art were then so fond of their richly painted exteriors, that they sacrificed for color even the beautiful surface of their finest marble. We too might see beauty in a painted front if we could but handle our paint as it was handled by the Greeks, and had not lost all true taste and feeling for strong color.

If then cast-iron possesses, in a high degree, these essential qualities, we have done it injustice, and somewhat blindly discouraged any attempt to improve its condition. At all events it cannot be denied that much abuse has been heaped upon it, having for its only ground that very abuse itself which it has suffered from our handling. Treat it artistically, and perhaps we shall find the chief reasons for abuse will be removed.

The facility with which scroll-work can be multiplied in cast-iron, though one of its chief merits, has proved under our treatment to be one of the principal causes of its ill success. I do not refer to the repetition of forms necessitated by the construction, as, for instance, the main lines of the brackets used to support a cornice, — these having similar functions should receive similar treatment, — but to the unnecessary and meaningless scrolls applied for ornament and to the reduplication of casts of the same *work of art* wherever applied. A work of art repeated without variation, simply because the process of reduplication is cheap, fails at once to produce the desired admiration, both because the motive is evident and because the very object of the work of art is lost sight of or ignored. The repetition of the same story or idea beyond certain limits, however good that story may be, does not increase its use or interest, but rather indicates the weakness of the author.

Where the ornament is of such a kind that it can be formed naturally of cast-iron or of wrought-iron as it was treated by the Gothic architects, its effect used with discretion must be pleasing. As an illustration, the foliated capital of a column treated like a stone-carving would produce a heavy and awkward appearance, because iron cannot be undercut like stone, but must be drawn from a mould. But unlike stone the far more effective treatment of overlaying is open to the iron-worker; and a lightness and strength of shadow corresponding to the general character of iron-work may be obtained in a legitimate manner. Such foliations may be treated far more boldly in iron than in either stone or wood, on account of the freedom of the former from liability to crack under the influence of the weather.

Cast-iron partaking more of the character of wood than of stone, iron architecture should more nearly resemble wood-work than masonry. The projection of cornice, caps, and hoods may be carried out to any desired extent for the purpose of shading the front and protecting the paint.

Where, however, sculptured panel-work is required to any great extent, it would be well to combine with the iron some material adapted to receive chiselled work.

Although up to this time, no attempt has been made to combine in this way, for ornament, other materials with iron, I nevertheless believe that very beautiful effects might thereby be produced.

Terra-cotta is a material which in many respects resembles iron, and might be combined with it in the form of sculptured panels with the most brilliant effect. Colored in its manufacture to any shade desired, in such a manner as to rival the beauty of the richest stones, it could be made to harmonize with the coloring of the iron-work; and its presence would relieve the eye from the monotonous nature of the surface of paint.

Terra-cotta may be carved like stone. It is a mistake to sup-

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pose that, because it is a plastic material, every thing done in it must be cast from the mould, and bear the character, marks, and monotony of the mould. There is no more necessity for using moulds for terra-cotta than for reduplicating ornaments of stone. Moreover, the material actually built in is the same that came direct from the hands of the artist, and not, like stone-carving, frequently only a copy of his clay model. The work is touched up and chiselled by the artist himself when partly hardened before it is baked, so that when finished it retains forever the character and sharp impress of his tool. Thus a work of art in terra-cotta combines the advantages of the freshness and vigor of the clay model and the beauty and durability of the stone. It gives too, like iron, an opportunity for brilliant effects of light and shade by the application of separately modelled pieces of material superimposed over the recessed parts while all are soft, and then the whole being burnt together into one homogeneous mass. By this means the economy in proportion to the effect produced is great.

In its power of resisting fire, its immense strength, its mode of manufacture, and its durability, terra-cotta again resembles iron. It is, in fact, imperishable, and in its artistic effects unchanging. In its iron frame it would stand firm long after the surrounding stone-work had blackened or crumbled into dust.

The iron front of which the sketch in this number gives the form though not the color (most important element in the design of an iron front, and sometimes its only redeeming feature) is, in default of drawings of the many better ones which we know to exist, referred to as illustrating in a degree some of the principles to which we wish to call attention. The introduction of panels of terra-cotta was impossible, even if in this case it had been desirable, on account of the unusual hurry occasioned by the circumstances of the fire.

The piers are run up through the second and third stories, the first story acting as a base, and the attic as frieze and cornice. In this way one of the most important and characteristic peculiarities of iron construction is displayed; for we must recollect that in our iron fronts that which appears on the surface to be a series of independent columns, one above the other, and separated by their respective entablatures, is in reality, behind the deceptive veneering of "the orders" applied to the exterior for ornament, only a single column running up through all the stories from basement to roof. All the rest of the front is bolted or hangs, as it were, to these upright pillars. No heavy horizontal courses are necessary as in other kinds of structures, because here the interior construction rests on the side or party walls. Only light screen or panel work unites the uprights. Hence their continuity is unbroken; while with masonry, on the contrary, the pillars between each tier of window opening must support the heavy horizontal blocks which crown these openings. While iron-work is perpendicular, and secured by bolts, masonry is laid in horizontal courses, and its principle of immovability, or resistance against overthrow, is in its gravity. The principles of construction being directly opposite, the form must of course also be different; and what is appropriate and beautiful for the one material is false and ugly for the other. The iron front, then, consists practically of a row of hollow columns rising uninterruptedly above each other from basement to the roof. Every thing else is bolted to these; and the bolt-heads should, where possible, be treated ornamentally. Consequently it is not only a legitimate and truthful method of designing an iron front, but the only one in accordance with its actual construction, to run the piers boldly up through all the stories from bottom to top, and to represent all that lies between the piers as bolted or hung, with or without the aid of brackets, to their sides. The system generally adopted is quite different from this. Two or three hundred capitals and bases, usually all exactly alike, with their respective architraves, friezes, and cornices, corresponding more or less with the various floor levels, are sprinkled over the front without any meaning or object other than that of imitating some equally monotonous building in stone.

The Grecian "orders" should never be represented in iron architecture except in buildings of a single story in height.

With stone-work it is different. Where the "orders" are used, it is utterly false in design to run columns through two or more stories; because the entablature, which represents the floor supports, cannot be bolted, as in iron-work, to the side of a continuous pier, but must rest immediately upon a separate pillar of its own. Thus at each story where there is an architrave there should also be a column with its capital and base to support it, and complete "the order." The Greeks, with their delicate and refined taste, invented the capital to express by some art form the conflict between the column and its architrave,— that is, the conflict between the downward pressure exerted by the architrave upon the column, and the resistance to that pressure on the part of the latter. The art form chosen was the bent leaf; and this sculptured on the shaft at the point of conflict, or contact with the architrave, gave rise to the famous Greek capitals, so often copied but so seldom understood. This may now be considered as an established fact, and disproves the various absurd theories published in popular histories of architecture in regard to the origin of the Greek capitals — as, for example, that based upon the story of the basket of a Corinthian virgin placed upon an acanthus-plant suggesting to Callimachus the Corinthian capital. If I may be permitted to add any thing to your letters above referred to on the coloring of this ancient architecture, I would say that according to Carl Boetticher, Professor of Greek Architecture at the Royal Academy of Berlin, an able and active student of the exhumed ruins of their temples, Doric capitals have been discovered clearly sculptured and painted with the leaves bent as above described. In order to distinguish the heavier from the lighter orders, the leaves in the capitals were represented as more or less strongly bent. Thus in the Doric, or heaviest of the orders, the point of the leaf was doubled entirely over until it touched its base, indicating that a prodigious weight was borne; whereas in the Corinthian, or lightest of the orders, the ends of the leaves are but slightly curved, and convey the idea of grace and lightness. This acceptation explains satisfactorily what otherwise would seem an unaccountable tautology in the multiplied repetition of the same form of floral decoration in a single building of the Corinthian order.

In the Gothic architecture no such art form was required, as there was no conflict to express. The Gothic capital had a totally different origin and meaning. It merely marked the springing of an arch from a pier, and hence could be treated far more freely. Following the same principle in the iron building in question, no capital at all has been represented on the piers running through the second and third stories. Merely a rosette or ornamental bolt-head in a square panel marks the springing of the arch from the tops of the piers, for these arches are actually bolted to the piers.

The building being backed up with brick, our problem becomes more complicated, and the design more difficult; for in it must be reflected the presence of the brick-work. Hence a somewhat heavier appearance has been given to the building than would have been necessary for iron alone. Hence the form of the first story, and the heavy arches above the third. This brick-work serves not only to protect the iron in case of fire, but also to equalize the temperature of the building in winter and summer. It serves also to keep the interior of the iron-work dry by preventing the possible congelation of water in the atmosphere upon the inner surfaces.

In masonry, when no orders are used, a portion of the piers may often be carried up through several stories without impropriety; for they act merely as buttresses to strengthen the walls where they are most in need of strength. If arches be thrown from pier to pier at the top of the building, still no fault can be found with the design, because it is truthful to the construction. Objection has been made to the arches in this building, on the ground that they are stone forms and inappropriate to iron. It is easy to show the incorrectness of this criticism. The iron arch, far from being a copy of the stone arch, is, on the contrary, the only one which is perfect and in every respect unobjectionable. The arch of masonry is to such a degree objectionable on account of the lateral thrust, that the Greeks never trusted it. In the quaint language of architects of India, "the arch never sleeps," but is always at work trying to tear the building to pieces. The iron arch, being formed of a single piece, is in a great measure free from this objection, while it contains that element of strength which its approach to the parabolic form gives to the arch in general.

These arches are ornamented with the moulding vulgarly called "the egg and arrow ornament." This ornament is of Greek origin, and is another art form used by them to express the conflict, explained above, between two members of the architecture. It is a conventional representation of a double row of leaves bending under some superincumbent weight. The Romans copied this moulding, and called it "the egg and arrow ornament," which illustrates well their total inability to appreciate the spirit and beauty of Greek art; for, of all things in the world, what more unfortunate choice could have been made to place between two heavy pieces of masonry than eggs and arrows!

With regard to the rest of the decoration, care has been taken that no ornament should in any case be applied without its *raison d'être;* and nowhere, except in panel-work, has any ornament been employed where the members of construction did not demand some art form to express their functions. For the purpose of heightening the metallic character of the building, it has been painted a light bronze-green color enlivened on the projecting parts with gold, and in the recesses with Indian red.

But without going further into details, I will only add that, as no national style is possible unless we make the best use of the materials at our command, and refuse to reject any one of them until we have first proved it to be unmanageable; and as ample light and air space, economy, and non-combustibility are the chief desiderata of mercantile buildings in America, — iron should not be too summarily disposed of for building purposes, for it may be found that it contains for the satisfaction of the above desiderata, valuable qualities which no other material possesses in an equal degree.

JNO. PICKERING PUTNAM.

THE NEW HAMPSHIRE STATE PRISON. — The Governor and Council have approved the plans for the new State Prison at Concord, which is to be situated a mile and a half from the State House, near the Concord and Claremont railroad track. The brick walls will include four acres, the main building being 320 feet by 46, with three wings, and a 240′ x 40′ workshop. There will be room for 200 convicts. The building will not be ready for two years.

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THE ILLUSTRATIONS.

MONUMENT OF THE RUSSIAN EMPIRE, AT NOVGOROD, RUSSIA. M. MIKESCHINE.

THIS monument was erected to commemorate what is called the one thousandth year of the Russian Empire, dating from 862 to 1862. The upper part of the monument, of bronze, consists of an orb 15 feet in diameter, which is surmounted by the cross and two figures emblematic of the Orthodox faith as the foundation of the moral elevation of the Russian people. Around the lower part of the orb are nineteen figures, each 12½ feet high, which are arranged in groups, and typify the six principal epochs in the history of Russia. First, Rurick, who represents the foundation of the Russian State, 862. Second, Vladimir, who represents the introduction of Christianity into Russia, 988. Third, Dimitry Donskoi, who represents the liberation from the Tartar yoke, 1380. Fourth, Ivan III., who represents the foundation of the Russian monarchy, 1462. Fifth, Michael Fedorovitch, who represents the restoration of the monarchy by the election of the house of Romanoff, 1613. Sixth, Peter the Great, who represents the reformation of Russia, and the formation of the Russian Empire, 1721.

The lower part of the monument is partly of bronze, and partly of granite. The portion immediately under the above-named groups is of bronze; then comes a cornice of Serdobol granite, then a series of bas-reliefs in bronze, and then a socle of granite. The bas-relief, which is five feet high, is occupied by figures of men and women, one hundred and seven in all, who have contributed by their exploits to the glory of the Russian Empire.

The diameter of the lower part, where it is girdled by the bas-relief, is about 28 feet. The height of the whole monument is 50 feet. The weight of the bronze portions is 65½ tons. The cost of the monument was 480,000 roubles, or about $384,000. In the view, which we take from the volume of the *Builder* for 1863, Peter the Great is seen at the right hand, protected by a winged figure. The figure at the left is that of Michael Fedorovitch.

The monument, which was designed by a young Russian artist, M. Mikeschine, is bell-shaped, in order to remind the people of the great bell which was always rung when the Tartars threatened an invasion.

OLD HOUSES AT LENOX AND LITTLE HARBOR.

See article, "Georgian Houses of New England."

DETAILS FROM IRON STORE, BOSTON, MASS. MR. J. P. PUTNAM, ARCHITECT.

(4 Pemberton Square, Boston, Mass.)

See article, "Cast-Iron Fronts and their Decoration."

THE TIMES BUILDING, PHILADELPHIA, PENN. WILSON BROTHERS & CO., ENGINEERS AND ARCHITECTS.

(410 Walnut Street, Philadelphia, Penn.)

This building has just been completed for the *Times* Publishing Company, and has been planned with special reference to furnishing well-lighted airy rooms for first-class business offices; and the fact that all the rooms except those needed by the *Times* itself were well rented immediately upon the completion of the building, is good evidence that this has been accomplished. The building is constructed of best Philadelphia pressed brick relieved with black brick, encaustic tile, and Ohio-stone wrought work. The base course is of granite; and polished Bay of Fundy granite columns are used under the balcony and between the windows of fourth story.

GEORGIAN HOUSES OF NEW ENGLAND.

THE English Queen Anne designers have a way of justifying their many vagaries as follows. They say: In the seventeenth century men had rather ceased to think of style. Classical detail as introduced in Renaissance days had become completely naturalized, and gradually it had ceased to be used in a servile way, or with great regard for precedent; but it simply made things seem attractive without much thought of purity of style, or style at all. Following this came the successive revivals, — of Palladian art, then of Grecian work, then of all the phases of Gothic, — all these lifeless imitations of the antique. From this study of archæology the Queen Anne men profess to rebel, and to turn to the point where our art was before all this direct imitation of obsolete forms began. They find more of the spirit of independence and carelessness for precedent which they seek for in the work of the seventeenth century than elsewhere; so they study and work on that basis, but are ready to combine any thing with it which is attractive. They say they have red bricks and white mortar for their walls, tiles for their roofs, and white sash frames for their windows; and of these the house shall be made.

All this sounds like good reasoning, although in practice the antiquarian spirit makes the movement seem much like other revivals. In fact, we really know that reasoning is not at the bottom of it at all, but that Mr. Norman Shaw and others like him admired and studied and sketched all the quaint old work they could find, and that this work enlivened by their talent has set a quietly imitated example to other designers. If we follow their lead without any native Jacobean or Queen Anne models of importance to inspire us, we shall but be adding one more fashion to our already rather long list. A neo-Jacobean table can join the Eastlake chairs, the American rococo mantel, and the Puginesque sideboard in our dining-rooms; but there is nothing in this but an additional fashion. Now, however, that this wave is felt along our shores, can it not be directed into more fitting channels here even than it has worn for itself in England? We too have had our revivals; and if we go behind them we find in the Georgian days men working without thought of style, simply, delicately, beautifully. Many a choice wooden cornice, many a stiff mantel in our farm-houses, attest this. Plancia, fascia, and soffit still are Yankee words in spite of our mediæval period. With our Centennial year have we not discovered that we too have a past worthy of study? — a study, too, which we can subsequently explain and defend by all the ingenious Queen Anne arguments, strengthened by the fact that our colonial work is our only native source of antiquarian study and inspiration.

Put our heirlooms — any old material we have — into a Gothic room, it is more or less out of keeping. In fact, with these successive fashions, we have to build not new houses alone, but all their furnishings to match. Our heirlooms are tall clocks, Copley or Stuart portraits, convex mirrors, ancient chests and drawers, bits of carving perhaps by Gibbons, Paul Revere tankards or andirons, brass candlesticks, and chairs that came over in the Mayflower. We think with interest of the parish glebes of Cambridge and Portsmouth, of the old Tories' Row in Cambridge; while many are the old wainscoted rooms for which we have an affectionate remembrance; the staircases with boxed steps with a rich scroll under each box, and with the varied balusters carved into a twist by hand; the great brick chimney-corners with Dutch tile borders, and crane, pot-hooks and trammels, and hanging kettles, and the yawning flues resting on oak mantel bars and opening a clear road to the stars above. With all this in the old houses, we find a classical detail universally used, the common language of every carpenter, and treated freely with regard only to comfort, cosiness, or stateliness, and with no superstitious reverence for Palladio or Scamozzi, those bugbears of later years. In studying this colonial work, we find all the delicacy, grace, and picturesqueness, that any model can suggest to us; and combined with it a familiar aspect, and a fitness to harmonize with all those heirlooms and old possessions, that might be put to shame by other fashions. In short, we like it all; and if we want to excuse it we can with the Queen Anne men say we are returning for models to the time when men worked naturally and without regard to style, and that on that stock we propose to graft whatever else now attracts us.

I have said that our sources, and the period that interests us, varied from that which the Queen Anne men affect. True, we have our Charles River, our Cape Ann, our Queen Anne's Corner, and we have many houses of early date. The Craddock mansion was built in the day of Charles the First; the Fairbanks house in Dedham, and the Curtis in Jamaica Plain, during the Commonwealth; and these are still occupied by the families of their builders. The Province House is of the time of Charles II.; the Sudbury Inn of James II.; the Batchelder House in Cambridge dates from William and Mary; the Old Corner Bookstore from Queen Anne; while the President's House and Massachusetts Hall at Cambridge, and the Adams (once Vassal) house at Quincy, all date from the reign of George the First. These are but representative houses; but yet the richest and finest models we have date from between 1727 and 1760, when George II. reigned: Pepperell House in Kittery, 1730; Hancock House, 1737; Royall House, Medford, 1738; Holden Chapel, Cambridge, 1745; Wells mansion, Cambridge, 1745; Wentworth House, Little Harbor, 1750; Longfellow (Vassal) House, 1759; Ladd House, Portsmouth, 1760.

If we study these colonial buildings, we see nearly all the early work in this neighborhood roofed with steep-pitched gable roofs. Rare instances occur like the stone Cradock House at Medford, when the gambrel roof appears earlier; but from 1686, the date of the Sudbury Inn, to 1737, the date of the Hancock House, the gambrel roof is common. Later it became frequent to pitch the roof in from all sides to a ridge or to a second pitch surrounded by a balustrade, and it is under such roofs that the richest interiors of our neighborhood still are found; such as the Longfellow and Wells and Riedesel houses in Cambridge, the Ladd and Langdon at Portsmouth, the Winslow at Plymouth, the Lee at Marblehead (?)

Thus we see that the gambrel roof is typical of but one period of colonial work. Where it came from, I cannot imagine. I recall no English type of the sort, and I should be glad if somebody can explain it. It is said that the bricks of Peter Sergeant's house, afterwards the Province House, were brought from Holland; and is it at about that date that the gambrel roof became prevalent. Is it a reminiscence of Holland? It could hardly be a fashion adopted from New York.

The later and richer mansions were large and square, and with so little detail outside, that one built now would, without the glamour of age, seem unpleasantly angular and box-like. But this

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is by no means a characteristic of all colonial work. The old Fairbanks house at Dedham, partly early with high-pitched roof and partly later with gambrel roof, forms a most picturesque pile; and so does the scattered house at Little Harbor, with gables at different heights, and floors at different levels; while the council-chamber wing runs off at an uncalled-for angle with the main building, that would delight Mr. Norman Shaw. Again, among the gambrel roofs, the great lumbering Sudbury Inn forms a most hospitable group, with its wide-spread barns and out-houses; while the Goodman cottage at Lenox smiles through its shrubbery, and winks its many-eyed sashes at the wayfarer. This picturesqueness I have endeavored to illustrate in the sketches with this paper, and we see that a picturesque group of any sort is thus not incongruous with our purpose; while of the interiors there is no need of words. We all know and like them; and it is because we too want to live amid wainscoting, nestle in elliptical arched nooks, warm ourselves beneath the high mantels at blazing wood-fires, and go up to bed over boxed stairs with ramped rails and twisted balusters, and see our old chairs and pictures thus appropriately environed, — it is because we like and want all this, that we seek for an excuse to do it all again. But isn't our liking reason enough?

In all this, I have dwelt on the colonial mansions, not because we have no public buildings. The Old North Church, the Old State House, the Newport State House, the "Old Ship Meeting-House" at Hingham, — all are excellent buildings. But except in peculiar spots, there is less to suggest such work in public buildings than there is in the home. A schoolhouse soon to be built in Deerfield, near the site of the Indian massacre, not unfitly recalls colonial architecture; but for a Western State House there would seem to be no more reason for this spirit than for a Gothic or Italian one. This lays bare at once the thinness of any argument in the matter; and we come back to that always satisfying reason, that in one case it is eminently appropriate, because we like it; and in the other, eminently inappropriate, because we don't like it. For once, at least, let us reason like our clients.

But this, after all, is not a very bad reason, if, as I think, we are past the battle of styles, and the fancies of the artist are become of proportionally greater importance. As soon as we begin to design detail we must, as it were, talk in some intelligible language, or in a *patois* formed from several. Many influences may guide us to different sources of inspiration. I think we, most of us, admit the good in most of these sources, and feel that as any designing worthy the name will hereafter be done by men who are more artists than their predecessors, so what we shall care for in the design is not its historical accuracy, but the artist's clever art in harmonizing whatever his fancy does lead him to, with itself and its surroundings. From this point of view, whatever the attractions of other sources, from no field can suggestions be drawn by an artist more charming and more fitted to our usages, than from the Georgian mansions of New England. GEORGIAN.

THE WASHINGTON MONUMENT.

IN the discussions growing out of the proposition to complete the Washington Monument, no stress has been laid on the opportunity that might have been improved to make of it an historical epitome of the events that led to its erection. To one unfamiliar with its history, the pile must appear an enigma in stone; certainly it is far from ornamental or useful, and there is no apparent reason for its existence. If an explanation of its meaning were asked of some bystander, he would probably reply that it was erected to the memory of Washington; the form of the obelisk, the most perfect exponent of unity and dignity, as well as the type of the present and future greatness of the Republic, having been chosen for that purpose. The failure to chronicle any thing connected with its own history must be patent to the most casual beholder; and its faultiness in design and construction has been so frequently set forth, that I shall merely refer to it in the light of an historical record or archive in an enduring form. The whole idea in its design seems to have been height, as if that alone were expressive of dignity and grandeur. Mass and grace of outline certainly add much to the beauty of design; and when to these we give an historic significance by recording in stone, marble, or bronze, a series of events culminating in a successful war and the founding of a nation, we have done honor not only to the individual, but have paid a fitting tribute to the love and veneration of the people. All nations have delighted to erect monuments to the memory of men who have been eminent in their service, thus recording their deeds for the emulation of succeeding generations. And in many of them we see a desire to tell a straightforward consecutive narrative of persons and events. In illustration of this, I shall only call attention to three examples, making no attempt to define their position as works of art, or to criticise their defects, which show how their projectors have labored to put before us a lasting chronicle of an epoch or the life and history of a nation.

The monument of Frederick the Great at Berlin is at once grand and imposing. In the fine modelling and grouping of its several figures, where the sage, the warrior, the statesman, and the poet seem to throng around and support the central figure of the king, we read an interesting history. The panels are filled with bas-reliefs of his private life in happiness and reverse, — the lonely flute-player, the defeated king at Kollin, the connoisseur of art examining an antique bronze, the student of weaving in the Silesian hut, and at length, crowned with laurels and palms, borne aloft by the eagle of renown towards the clouds, where his star "Frederici honor" is resplendent. No Roman toga envelops the form of the king, no heathen emblems surround him; massive and stern he sits aloft, a soldier and an absolute king, as when in life he rode down the Linden; the king who felt himself to be the chief of the nation, and who had said, "I merit no thanks: I have only done my duty." In presenting Rauch the sculptor with the freedom of the city, the Common Council of Berlin used these words: "You have completed a work which long will serve as a means for the mind-elevation of the people," — a fitting and eloquent tribute to the master mind that designed and executed the colossal figure.

A monument of an entirely different type, but, like that of Frederick II., modelled with a desire to perpetuate and foster a love for the history and gradual development of the nation, is that erected at Novgorod to commemorate the thousandth year of the Russian Empire (862–1862). Its very location is suggestive. Novgorod is geographically the centre of Russia in Europe, and midway between the cities of Moscow and St. Petersburg, besides being the seat of the great annual fair at which are represented the industries of all Europe and the Orient. Surrounding the bronze orb are nineteen heroic figures well and intelligently grouped, representing six periods of the nation's history, from Rurick, who founded the Russian polity, to the Empire of Peter the Great. The costumes are varied, and the faces and figures peculiarly marked and strong. Below these groups a bas-relief surrounds the base, representing a hundred and seventy men and women who have contributed by their exploits to the glory of their country. The orb is surmounted by a Greek cross and two winged figures emblematic of the orthodox faith, regarded as the foundation of the moral elevation of the Russian people. The general outline of the monument is that of a large bell.

The triumphal column in the Place Vendôme at Paris (destroyed by the Communists, and since restored), although confessedly a copy from that of Trajan at Rome, appeals to the love of military glory that inspires the hearts of all Frenchmen. Here we have a bronze legend of the years 1805–6. Starting from a plain and simple basement, a spiral ribbon winds around the tall shaft; the story of the campaign gradually unrolls, from the declaration of war to the triumph of Jena and the peace of Tilsit, — the whole surmounted by a statue of Napoleon, whose genius it commemorated. The very material of which it is composed, the bronze of captured cannon, gives point and emphasis to the monument; and there is a grim acknowledgment of its merits in the resolution of the Prussian Chambers to erect a monument to the triumph of Sedan with cannon captured from the soldiers of the Second Empire.

Compare the dimensions and altitude of these examples with that at Washington. The height of the monument to Frederick II. is 43 feet, that at Novgorod 50 feet, and the column in the Place Vendôme 143 feet; while the vast pile of masonry at Washington is designed to rise, a plain unbroken shaft of stone, with the outline but not the spirit of an obelisk, to the height of 600 feet. A constructed Egyptian obelisk surrounded at the base by a Grecian peristyle! what can be more incongruous than this its original design, now mollified, it is true, by omitting the peristyle? Curtis said of it more than twenty years ago, "So far as it is finished it is one of the blankest, ugliest, and most unmeaning piles that encumber the globe. It lies like an incubus on a lovely landscape; and the money that should be applied to its swift removal would be money wisely spent." AYRAULT.

WHAT CONSTITUTES QUEEN ANNE?

TO THE EDITOR OF THE AMERICAN ARCHITECT.

Sir, — Your London correspondent blames me for confounding "The Wispers," "Cragside," and St. George's House in the Centennial Exhibition, with Queen Anne buildings.

In mitigation allow me to say that I did not pretend to know of my own knowledge what buildings were canonical and what not; but thought I was safe in taking the classification of a professed admirer of the style. I quote from Mr. Holly's first paper on "Modern Dwellings" in Harper's for May, 1876.

"They are described by Mr. Ridge somewhat as follows: 'The Queen Anne revival shows the influence of the group of styles known as the Elizabethan, Jacobite, and the style of Francis I., which are now indeed to be arranged under the general head of "free classic;" but the Queen Anne movement has also been influenced by what is known as the "cottage architecture" of that period.' . . . Nevertheless they were very genuine and striking buildings, and have been taken freely as suggestions upon which to work by Mr. Norman Shaw in Leyswood, Cragside, and a house at Harrow Weald . . . ; and the cottages erected by the British Government on the Centennial grounds at Philadelphia are adequate illustrations of this style."

Whether I was warranted by this or not, is it not fair to say that if Cragside and the Wispers are not Queen Anne, and Lowther Lodge is, so much the worse for Queen Anne? S.

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BUILDING PATENTS.

IN the *Official Gazette* for Sept. 25, the following patents that have been issued upon new building-appliances are recorded: —

CHIMNEY-CLEANER. — S. H. Dickerson, Hudson, Mich. A noticeable feature is the bag for catching the soot as it is scraped off.

FIRE-PROOF JOINTS FOR BUILDINGS. — Charles Marcotte, St. Louis, Mo.

BELL-STRIKING APPARATUS. — G. M. Stevens, Cambridge, Mass. This apparatus is for use upon fixed bells in towers.

WATER-PROOF CELLAR BOTTOMS. — J. R. Anthony, Cedar Rapids, Io. An inverted brick arch rests upon a bed of cement, which is supported upon a framework of laths and boards. All water drains to a well-hole in the middle.

SHEET-METAL ROOF. — J. B. Clark, Ypsilanti, Mich. Sheet-metal, supported on the upper and lower flanges of I-bars; the space between is occupied by a corrugated sheet of metal joints protected by rolls.

BED-BOTTOM AND FIRE-ESCAPE. — R. O. Collis, Cincinnati, O.

FREIGHT-CHUTE. — W. C. Crompton, New York, N.Y.

LADDERS. — M. Foss, Cairo, Ill.

STOVES. — M. Jones, Hymer, Kan.

SHUTTER FASTENER. — G. W. Mudgett, Edgartown, Mass. For outside blinds and shutters.

DUMB WAITER. — J. Murtaugh, New York, N.Y. When one rope-brake is pulled, the other acts by means of a suspended weight.

COMBINED TIME-LOCKS, COMBINATION-LOCKS, AND BOLT-WORKS FOR SAFES. — J. Sargent, Rochester, N.Y.

STONE-SAWING MACHINE. — J. M. Ballou, Ontario, Can. The saws can be set at any angle for cutting pyramidal figures.

BUTT-HINGES. — C. B. Clark, Buffalo, N.Y. The pintle is provided with a square shoulder, to prevent its turning with the hinge.

HEAT-CONDUCTING MEDIA. — A. Densmore, Meadville, Penn. A solution of nitrate of soda is to be used as a circulating medium in heating apparatuses.

BUILDING-PAPER. — H. F. Evans, Chicago, Ill. Each sheet has indented parallel grooves near the two opposite edges.

FIRE-PROOF ROOFS. — S. Farquhar, Boston, Mass. Wooden rafters, iron purlins, and sheet-metal covering; the spaces between the rafters filled with fire-proof cement.

DOOR FASTENINGS. — E. Feige, East Saginaw, Mich.

LETTER-BOX, BELL, AND DOOR-PLATE COMBINED. — C. B. Geer, Union City, Penn.

CHIMNEY-CAPS. — E. Hawkes, Boston, Mass.

ROOFING-TILE. — J. W. Hoyt, Springfield, Mass. The tile consists of a metal shell, enclosing a non-combustible material.

EVAPORATORS FOR HOT-AIR REGISTERS. — W. R. Lafourcade, Beverly, N.J.

STONE-DRILLING MACHINES. — S. C. Nichols, Cincinnati, O.

VENTILATORS. — H. M. Sanders, Worcester, Mass.

BUILDING PAPER OR BOARD. — J. M. Cobb, Beloit, Wis. This paper consists of straw board, covered on both sides with a mixture of rosin and deodorized mineral oil, and calendered.

NOTES AND CLIPPINGS.

ORIGIN OF THE PATENT OFFICE FIRE. — The Board of Inquiry into the fire in the Patent Office has reported that a fire was built of pine boards and a blower placed over the grate in the ladies' copying room, in the Ninth-street basement, on the morning of the day on which the fire occurred, and that the roaring of the fire excited the attention of persons in the room, and was the subject of comment by them at the time. The testimony of several persons who were upon the roof some time before the alarm was given shows that a section of the wooden grating covering the gutter on the roof and lying immediately against the flue was found to be on fire, and was thrown off the roof into the yard on Ninth Street. The report says: —

"We think there can be no doubt that this dry pine grating was set on fire from sparks or burning cinders which came up through this flue. The amount of this grating which had been burned at the time the witnesses discovered it is variously estimated by them, but we conclude that not less than thirty square feet of boards had been destroyed. The witnesses state that they found a large quantity of live coals lying on the roof and in the gutter, and the copper was so intensely hot that it had changed color, and in some places sunk down as though there was a hole underneath."

THE NEW CAPITOL AT ALBANY. — The work on the Capitol is being pushed, mainly to the completion of the Legislative Chambers. The efforts made by the "A.I.A." and others, to secure an adherence to the original plan, if not entirely successful, have compelled the commission at least to restore work which had been destroyed on the north façade to its original symmetry. The Moorish stencil work on the pedestal dado, which with the Gothic cornice below was to have been removed, still remains, and will so remain; and the arches of Romanesque work begin to show like some new palace rising on the remains of an old one. The intention of the Act "to complete this great building," has been entirely evaded; and instead of carrying out the exterior according to the original plan, the Romanesque defiantly overtops the Renaissance.

ARCTIC MONUMENTS. — It is said that a Dutch expedition will be sent shortly to the Arctic to set up granite monuments to commemorate early Dutch voyagers.

FALL OF A COURT-HOUSE ROOF. — On the morning of Oct. 13 that part of the roof of the Brookville, Ind., Court-House which covered the court-room fell to the floor. The Circuit Court was in session at the time; but it being the last day of the term, few persons were in the room except the officers and attorneys. Strange to say, none were fatally injured, although all were more or less bruised. The roof of the building was being remodelled. The disaster was caused by the weight of the brick which had been taken from the walls, and placed upon the roof of the building. The workmen who were upon the walls at the time the accident occurred escaped without injury. The fire alarm was sounded, and the injured were taken out by the members of the Fire Department. The damage is estimated at $8,000.

THE PUBLIC BUILDINGS NOT FIRE-PROOF. — The commission appointed to examine the fire-proof qualities of the public buildings at Washington have reported. They find that the new State Department and Shepherd Building and the Coast Survey are as nearly fire-proof as buildings can well be, which are filled with records. Two old wings of the Capitol, adjoining the Congressional Library, are very defective, and have much wood under the roofs. The War Department records are stored in many buildings in great part mere tinder-boxes. The large Winder Building, in which are engineers', ordnance, and army rolls, is highly combustible in the upper part.

The Treasury records are in a large degree exposed, so far as the files of two of the important accounting divisions are concerned. Part of the Post Office roof is supported on wooden rafters. The National Medical Museum, the finest collection in the world, is in Ford's Theatre, under a wooden roof and cornice. The Agricultural Department, with its museum, is also unsafe. In fact, nearly all the Government archives are in constant danger from fire. The condition of affairs in this respect proves a surprise to everybody here, and presents questions which Congress must act upon at once. The remedy will require extended appropriations, and will furnish Congress much work.

THE DOUGLAS MONUMENT. — The committee in Chicago having the erection of the Douglas Monument in charge have decided that the present foundation of the monument is not strong enough to support the column, and have voted to tear it down and rebuild a solid foundation of granite. The remains of Senator Douglas will have to be removed while this is being done. The committee determined to push the work through to a rapid completion.

FIRES IN NEW YORK. — The Fire Marshal of New York City has sent in his monthly report of fires, etc., for the month of September, and also for the quarter ending Sept. 30. In September there were 124 fires, involving a total estimated loss of $564,242. The loss on buildings was $282,935, and on contents $281,307. The insurance on buildings was $401,650, and on contents $387,850 — total of $789,500; uninsured loss on buildings $26,280, and on contents $41,785, — total uninsured loss $68,065. For the same month of 1876 there were 74 fires, at an estimated loss of $96,357, the insurance being $856,000. For the quarter ending Sept. 30 there were 358 fires, involving a total loss on buildings of $300,940, and on contents $319,757, or a total of both of $620,697. The insurance on buildings was $824,130, and on contents $703,575, or a total insurance of $1,527,705.

STATE SURVEY. — A survey of the State of New York is now making. The stations for triangulation are marked by signal poles capped with tin reflectors upon the highest hills.

A TROUBLESOME PROBLEM TO SOLVE. — The Milwaukee *Wisconsin* thinks that the new residence of James Kneeland of that city must be the most elaborate structure of the kind in the West; and we quite agree with it. The lot is a full block, and the instructions to the architect were: "Give every room in the building an outlook towards Grand Avenue; secure for every room, even to the smallest, an outlook on three of the four streets which bound the building; provide that in every room there shall, at some time in each day, be a bright sunlight if the sun shines."

SOIL-PIPES. — At a recent meeting of the New York Board of Health it was resolved that soil-pipes in tenement-houses and vaults, when within twenty feet of any dwelling, should be carefully ventilated by pipes, to be laid as the Board directs. After Nov. 1, violations of this resolution will be prosecuted civilly and criminally.

THE ENGLISH CHANNEL TUNNEL. — Operations connected with the submarine tunnel have already been commenced on the other side of the Channel, several pits having been sunk to a depth of about 110 yards. At the same time the French and English committees have definitely drawn up the conditions of working for the route. The property of the tunnel is to be divided in half by the length; that is to say, each company is to possess half of the line, reckoning the distance from coast to coast at low tide. Each company will cover the expenses of its portion. The general work of excavation will be done, on the one hand, by the Great Northern of France, and on the other by the Chatham and South-Eastern companies, the two latter having each a direct route from London to Dover. All the materials of the French and English lines will pass through the tunnel in order to prevent unnecessary expenses and delay of transhipment, as in England and in France railway companies use each other's line, and goods can pass from one line to another without changing vans. It is understood that an arrangement will be established for a similar exchange of lines between all the English and Continental railway companies when the tunnel is completed. The tunnel will belong to its founders. At the expiration of 30 years the governments will be able to take possession of the tunnel upon certain conditions. — *Mining Journal.*

METRES AND YARDS. — Metres can be approximately reduced to yards, by adding $\frac{1}{10}$ of their number.

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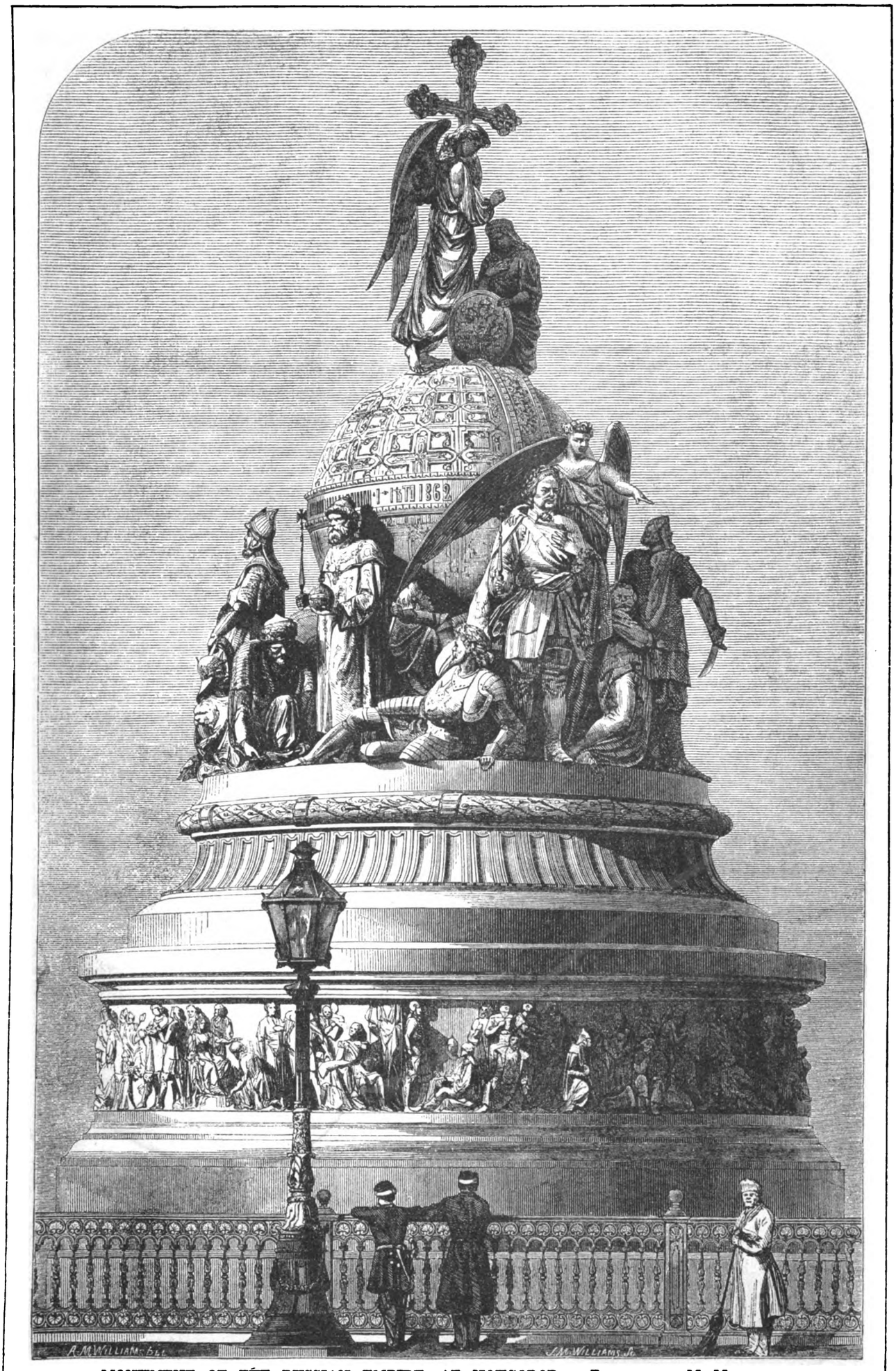

MONUMENT OF THE RUSSIAN EMPIRE, AT NOVGOROD.—DESIGNED BY M. MIKESCHINE.

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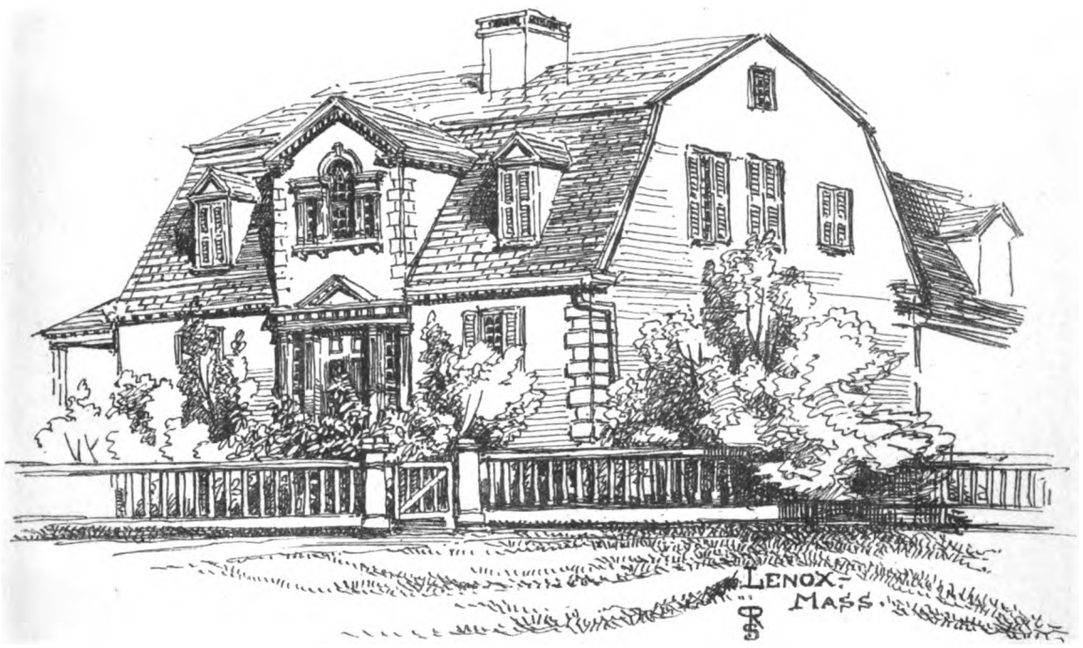

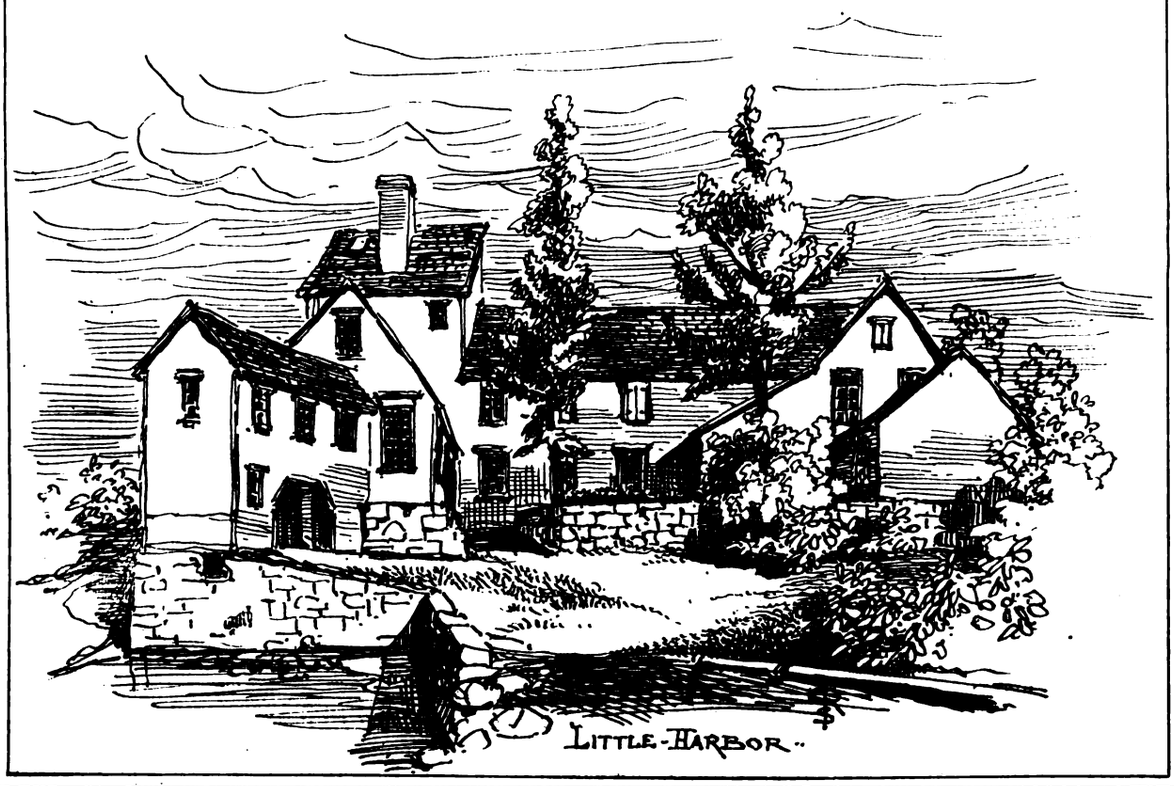

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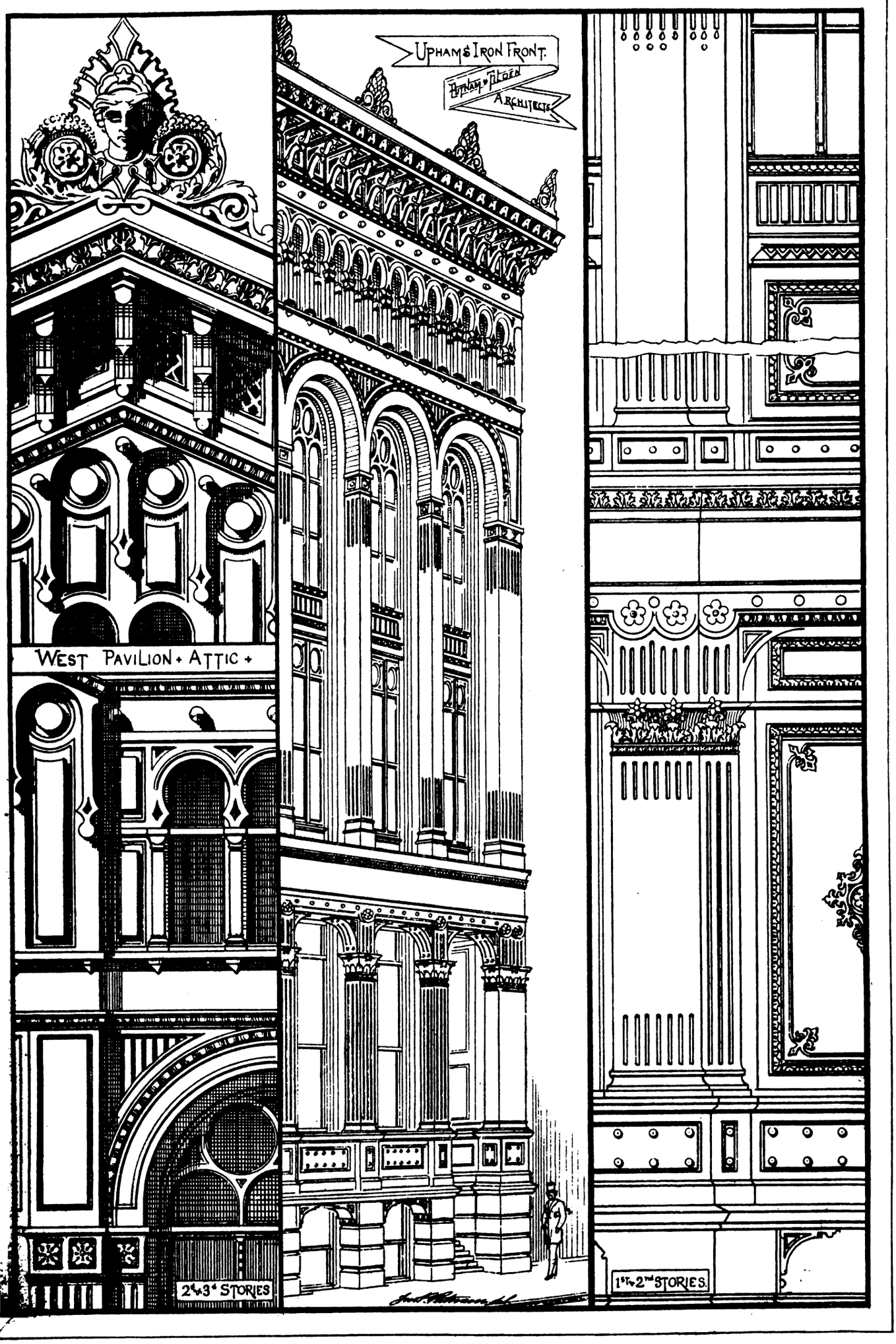

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, OCTOBER 27, 1877.

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THE Convention of the American Institute of Architects, which was held in Boston last week, was neither very largely attended nor exciting; but it was not wanting in animation and interest. It had the advantage of an unusually symmetrical programme, in which the discussions were well balanced between practical and artistic questions, and divided the time with executive business and sight-seeing. We may take it for granted that our readers know what the programme was; it was published a week or two ago in our summary. Unfortunately the three days which custom assigns for these conventions give hardly time enough for the amount of business and discussion that naturally falls to them. In spite of morning and evening sessions, and afternoon meetings, the final impression is that many subjects were passed over in less time than they deserved. Since, however, architects are a busy class, and are apt to feel quite as busy as they are, it would probably be difficult to persuade them to give more time than custom demands. The executive business accomplished in the sessions was for the most part not of very general interest. A considerable change in the method of collecting and managing the revenue of the Institute was adopted at the recommendation of the Committee on Finance, subject to the approval of the Chapters. The reduction of assessments which was made at the last convention had been found to compel recourse to the guaranty fund subscribed for this year; and it was voted to change the method of levying the assessments. A direct assessment was to be levied only on the members at large, and Fellows in Chapters; Associates in Chapters, who have no votes in the convention, being passed over, and the remainder of the budget raised by a tax on Chapters in ratio of membership. For this, and for other duties, including the consideration of increase of membership, a Committee of Ways and Means was appointed. The question of the Washington Monument was raised; and after considerable discussion, in which a prevailing opinion was developed, that while the present movement for finishing it should be opposed, the Institute ought not to be too forward with its advice, the matter was laid on the table. There was considerable discussion of the action due towards honorary members who might undertake to participate in professional practice; a matter which was left to the Board of Trustees, with the opinion, evolved in debate, that it would be better that such members should make application to become active members. A resolution was passed appealing to the Government to undertake tests of materials and methods of construction which claimed to be fire-proof. A valuable suggestion, which was appropriately referred, was made by the Rhode Island Chapter, that a report be prepared on the various building materials supplied by the country. There were some changes in the officers, of which the chief was the resignation of its secretary, Mr. Bloor, whose zeal, activity, and knowledge of the business of the Institute, has been its reliance for a number of years; and the election of Mr. Charles F. McKim of New York, as his successor.

THE professional subjects which had been assigned for discussion were arranged in combination with the excursions of the days for which they were appointed. Thus the visit to the new buildings of the "burnt district" was supplemented by the papers and discussion on fire-proof construction; the papers on religious architecture, by the examination of the churches on the Back Bay land; and those on colonial architecture, by the visit to old houses in Cambridge. As often happens, the discussions failed, on the whole, to bear out the interest of the essays that were read. The papers on fire-proof construction, read at the first evening's session, differed considerably in treatment of the subject, — Mr. Schumann's discussing directly the effects of heat on iron, and its protection; Mr. Lienau's chiefly the use of brick; Mr. Wight's the protection of iron from fire; and Mr. Hatfield's giving a *résumé* of the losses from fire in the country for a generation past, and of the value and proper use of wood, — but all agreed substantially in condemning the ordinary methods of fire-proof as inadequate, and in urging the necessity of protecting iron from fire by some more resisting material. A discussion of interest followed, but without adding any thing of importance to what was said in the papers. The essays on religious architecture, on the second evening, were more general and less specific than we had hoped; and the discussion on them had to give way to the pressure of executive work. The absence of Mr. McKim deprived the convention of the opening paper on colonial architecture. Mr. Peabody's, on the same subject, was published in the *Architect* of last week; this subject also was obliged to pass without debate. The papers on ventilation, by Mr. Briggs and Mr. Pfeiffer, and Col. Waring, were of unusual interest; the first leading to the unexpected conclusion that it was not desirable, but probably pernicious, in our climate, to add artificial moisture to the dry and heated air which our furnaces send up in winter.

PRESIDENT WALTER'S suggestive address is given on another page of this paper. Its remarks upon the education and qualifying of architects are very timely. We were glad to see that at least two of the Boston papers welcomed the opening of the convention in the same vein, with an appeal to architects to give the public some means of distinguishing between the trained and the untrained. The Boston *Advertiser* said, —

"There is one matter that ought to receive, and we presume will receive, the serious attention of this council of architects. Within the past year there have been an extraordinary number of accidents to buildings that were constructed under the supervision of architects supposed to be entirely capable. . . . A succession of calamities like this tends strongly to make the public suspicious of the qualifications of men who represent the profession. . . . There ought to be some way of professional recognition, that would be a reasonably safe assurance to the public that a man presuming to be an architect was reasonably expert."

This subject was brought before the Institute, and the Committee on Education was instructed to examine it, and report at the next convention what means could be adopted for securing the necessary qualification. It is an extremely difficult matter, and one that has often been considered in the Institute without leading to any practical solution. So long as no definite interest in it was to be looked for from the public, there seemed to be no hope of accomplishing any thing. Now we may hope that the opportunity has come. It belongs to those architects who profess an active interest in the standing of their profession, to take the initiative in the effort to define its proper limits; but if the public fails to support them with its interest, and in case of need by legislation, their task will be a difficult one, perhaps impossible.

IF there is one time more opportune than another to insist on a due technical education for architects, it is when the impression is fresh in the public mind of the disasters of the past four months; when on the one hand the architectural profession, just rising into prominence in the country, is called upon to show a good title to the position it claims; and when the country, on the other hand, exchanging its older buildings everywhere for more important ones of novel construction, which it wishes to be permanent, has need more than ever of a capable and trustworthy body of men to put in charge of its work. We may well say then in the words of

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Mr. Walter's address, that "the interests of architects demand the adoption of some such measures and the interests of the public demand it more."

There is certainly something attractive in the project of bringing Cleopatra's Needle to New York; and now that we have the promise of a single responsible man, and not the chances of a general subscription to trust to, the first great obstacle is removed. There are those to whom it seems a case of Elgin-like spoliation; and the feeling that would leave the grand old monolith to pass the rest of its days undisturbed is not without an appeal to one's sympathy. But we may remember that the obelisk was long ago taken away from its original surroundings, and that even the Roman building to adorn which it was removed has utterly perished, so that it stands bereaved of all its proper companions. There is no splendid and perfect building to be despoiled by its removal; no people who look back with pride to see the history of their ancestors embodied in it, and who will feel themselves plundered should it be taken away. It stands, on the contrary, a witness to the desolation of repeated conquests, exiled and among aliens in its own country; while here the very contrast between its antiquity and the newness of every thing around it could not fail to bring it some degree of reverence. If the permission of the Khedive is really assured, and there seems reason to think that this is the case, there is a fair prospect of actually seeing it in New York. It would be a notable achievement if Mr. Dixon succeeded in transporting both the obelisks safely over the seas; and yet the fact that the first has been recovered after going adrift gives good promise of success, and even failure in the case of the first would probably not discourage the second attempt. It would be worth while, however, we should think, to put off the effort to cross the ocean with it till summer, when there will be a reasonable chance of a smooth passage. Already the people of New York are exercised in the choice of a site for it. Of those that we have seen suggested, Madison Square seems at first thought the most promising. The *Tribune* makes the reasonable suggestion that now the funds for transporting the obelisk are assured without subscription, those who were prepared to contribute might profitably turn their efforts to the building of a suitable pedestal for the Bartholdy statue. Perhaps there is some other wealthy and public-spirited New Yorker who will make his contribution to the splendor of his city in that way.

The Keely motor, after being pretty well forgotten by everybody except the persons who were at work upon it, or had invested money in it, has come again into notice within a few weeks past. The *Scientific American* having lately disparaged his invention, Mr. Keely, who has all along been working hard at it, supported by some sanguine capitalists, wrote a letter to the *New York Herald* a month ago, inviting an examination of it by some capable scientific man or men, whom the *Herald* should appoint, — at its own expense, we presume. The *Herald* accepted the challenge; and since then the daily papers have been more or less busy with the motor, some talking hopefully of it, some denouncing it as a delusion, and others as a fraud. The *Philadelphia Bulletin*, writing with apparent knowledge and judgment, says that while Mr. Keely has probably made some discovery of interest, it is not likely to lead to any practical benefit, because his machine is too costly, is dangerous, and needs a scientific expert to handle it safely; because it is uncontrollable, uncertain in its action, and subject to rapid deterioration from the violence of the force it employs; because, finally, its action is intermittent, and cannot be kept up for more than a few minutes at a time. This is the most intelligent-looking account we have seen of the case, and is probably the best we shall have till the *Herald's* examiner makes his report.

The machine, so far as it is seen, is an enormously strong reservoir, called a "multiplicator," into which is introduced a small quantity of air at a tension of from one-third to two-thirds of one atmosphere, and water from a hydrant. The inventor claims that there is no use of heat, electricity, chemicals, or galvanic action. Persons who have seen the performance of the motor, report that a simple movement of a lever causes the generation of a vapor or gas, that escapes at a pressure of from three thousand to ten thousand pounds, increasing with the pressure of the air that is supplied. It is said that the escaping gas or vapor shows neither taste, odor, nor humidity; also that it condenses or dissolves in water. How far the observation of these not easily reconciled qualities is to be trusted, we cannot say. It looks as if the motor might be one of the class of machines of which a great number have been invented, but of which none except fire-arms have proved to be practically useful; which depend on the formation of gases by rapid decomposition in confined spaces, that is, by explosion, and as if the decomposition of water were the means employed. Such explosions have not yet been found controllable on a scale that makes them remarkable for any considerable amount of work, though many attempts have been made. On the other hand, it is whispered that the motor has really been discovered to be nothing more than a means for exerting enormous pressure through small space on confined air, by the multiplied pressure of successive hydraulic rams; in which case it would of course be utterly useless as motive power. We are loth to believe, however, that the inventor should either hope to cheat the public, or be able to cheat himself, with such a transparent fraud. Mr. Keely's reported claim to have discovered a means of generating force out of nothing, discredited his invention from the beginning. It is not likely that he has stumbled (we use the word advisedly) on any new force, or on any means of generating force without the consumption of a known equivalent. Since the discovery of the dynamical equivalent of heat and the convertibility of force, the amount of power which may be obtained from any given material or combination is a subject of sure calculation; and there is no likelihood that a new source has been discovered. When we remember that our greatest mechanical invention, the steam-engine, only utilizes as yet say a tenth of the force which its fuel supplies, we are inclined to think that the most hopeful way to economy is in increasing the efficiency of our present appliances.

THE CONVENTION OF THE INSTITUTE.

PRESIDENT WALTER'S ADDRESS.

Fellows and Associates: —

We convene to-day for the purpose of holding the Eleventh Annual Convention of the American Institute of Architects.

Through the goodness of Divine Providence, which it becomes us to recognize with gratitude, we come together with the added experience of another year, to transact the current business of the Institute, and to consider such questions as may come before us, having a bearing on the interests of the profession, and the general diffusion of sound views and proper conceptions relating to the science and practice of our art.

We have the privilege of meeting, on this occasion, in the metropolitan city of New England, — a city distinguished alike for progress in the arts of civilization, and for the culture, refinement, and commercial enterprise of its people. We held our Fifth Convention in this city, and we here begin to-day the second decade of these annual re-unions. We are glad to meet again with our Boston friends; and I sincerely hope that our convocation may prove successful in promoting the progress of architectural science, the well-being and efficiency of the Institute, and the general interests of the profession.

During the past year, opportunities for architectural development have been very much curtailed by the business depression which has so long rested upon our country, and, indeed, upon all centres of civilization throughout the world. It is nevertheless true, that the profession of architecture has never presented so encouraging an aspect as it does to-day. Wherever buildings of importance have been erected, an independence of thought has been manifested in details, as well as in the grouping of leading features, that more than indicate the processes of intelligent study.

An innate feeling of irresistible progress seems to have pervaded all our commercial centres, developing itself in palatial structures possessing far more artistic elegance than the more pretentious buildings erected in the recent past.

In various sections of the country, extensive edifices, both public and private, including several churches of magnificent

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proportions and costly finish, are now in progress of construction; thus characterizing the present era as one of decided progress. In our principal business thoroughfares, we find rich, effective, and novel styles of building, adapted to every conceivable species of enterprise; while on every hand we observe unmistakable evidence of progress in the arts of design, and in the sciences which relate to construction.

These remarks must not, however, be understood to imply a wholesale approval of all that has been done under the name of architecture: — by no means. While we find much to admire, we find more to condemn. We cannot, however, fail to observe that the proportion of unscientific building throughout the country is growing less every year; hence it becomes an important question for the Institute to consider, how a better taste in design, and more substantial methods of construction, may still further be promoted, even in the plainest and most inconsiderable structures.

It is a great mistake, to suppose that taste and solidity are necessarily expensive properties in building. The materials required for a small house, or a large one, may be so disposed as to produce pleasing effects, and at the same time give strength and permanency to the structure, without enhancing the cost, or interfering with the uses for which it is designed; and we all know that in more elaborate buildings taste and skill are far less expensive than ignorance and incapacity.

During the past decade architecture has taken a wide departure from the processes of thought that formerly held in check the spirit of inspiration in design; and the season which has just closed may be considered as having been more productive of originality in the conception of architectural forms, than any previous period of the world's history.

It is not necessary for me, on the present occasion, to allude specifically to the works which have been executed during the past year, as the most of the considerable buildings now in process of construction were commenced previous to our last convention, and were at that time graphically described in the opening address of Mr. A. J. Bloor, — an address which brings up our art through the mutations of a hundred years with historic accuracy, and which does full justice to the great centennial anniversary of our national independence.

In view of this valuable contribution to architectural history throughout the century, I deem it proper not to detain you with any descriptive account of the works now in progress, but rather to look at our art, in the light in which we find it to-day.

Architecture as now practised has evidently ceased to be confined to certain schools, founded upon principles of law and order, evolved from the fragmentary remains of nationalities which have long since passed out of existence. The advancement of the physical sciences, and the development of the æsthetic nature in man, have wrought astounding changes in the processes of architectural thought, — changes which admonish us not to go to the other extreme, but rather to guard against becoming too eclectic in our practice, and letting extravagant freaks of fancy carry us, in our conceptions of material forms, beyond "the eternal fitness of things," and the irrevocable principles of beauty, — principles which can never be violated without producing effects always to be deprecated.

From a retrospect of the past, it is evident that under all circumstances, — in war and in peace, in prosperity and in adversity, — the progress of the American mind in the arts of civilization is not only constant, but cumulative. It is worthy of note in this connection, that while the savagery of our recent internecine war was ravaging the country with unsparing hand, dealing death and destruction to our dearest interests, art lived, and architecture never ceased to develop itself in forms of beauty and of use. It is nevertheless true, that the advancement of the arts of peace is greatly promoted by public tranquillity and commercial prosperity; but it is equally true, that art manifests a constant progress, let the circumstances of the times be what they may.

It should be remarked, that progress in architecture means the acquirement of knowledge in all that pertains to architectural science; it is therefore obvious, that a high degree of excellence in that art can only be effectively promoted by insisting on a thorough course of education on the part of those who propose to enter the profession.

A uniform system of study should be faithfully pursued by every student, first in the college or technological institute, and then in the office of some professional architect, whose certificate, duly countersigned by order of the American Institute of Architects, after a proper examination under such rules as it may hereafter be deemed expedient to adopt, shall be his warrant for practising his art; and those only who shall thus have been systematically inducted into the profession should be recognized as fitted to pursue its practice and assume its responsibilities. The interests of architects demand the adoption of some such measures, and the interests of society demand it more.

A large portion of those who assume the title of *architect*, and publish themselves as such, have never pursued any systematic course of architectural study, and are wholly unfit to take upon themselves the responsibilities of the profession: it is therefore important to adopt some means by which such persons may be distinguished from architects who have been properly trained, educated, and prepared for the practice of their art. The system of certificates or diplomas, as suggested, would partially meet the case; but more than this will be required wholly to abate the evil.

The study of the sciences, upon which a proficiency in architecture mainly depends, having become a distinctive department in many of our colleges and technological institutes, students desiring to prepare for the practice of that art now have opportunities to acquire a far more thorough training in the courses of study which pertain particularly to architecture, than could possibly be acquired in an architect's office.

I may be permitted to say in this connection, that the influence exerted by the Massachusetts Institute of Technology, in the proper training of art students, is putting Boston far in advance of any other city in the Union; and we may hope that ere long opportunities will be afforded at all our seats of learning, for the special training of students intending to pursue architecture as a profession.

Those who go through a collegiate course of study in the sciences which underlie architecture, with a view of becoming architects, undoubtedly lay the best possible foundation for excellence in the profession. They are thus prepared for the attainment of a more practical knowledge, which, it should be remarked, can only be acquired in the office of an architect, where the every-day practice of the profession affords facilities for the completion of a thorough architectural education, which no amount of theoretical training alone could ever accomplish.

I should not feel justified in omitting to say something on this occasion, in relation to the very objectionable process of procuring designs for public works, by open or general competition, — a process to which architects of standing in the profession will rarely submit.

The subject has often been brought before the Institute; but thus far, the evils of the system have never been so treated as to secure satisfactory results.

The *modus operandi* of such competitions is bad from beginning to end. The work to be competed for is usually put in charge of a committee, or commission, as the case may be, who issue a general invitation to architects, by advertisement or otherwise, to exercise their skill in preparing designs, specifications, and estimates for the proposed structure. The inducement held out to them to enter the lists, consists of an offer of some *three* or *four* premiums, to be awarded to such as may be adjudged to have submitted the most meritorious designs. But what is to become of the rest of the competitors? Every one of them must necessarily have devoted no small portion of time to study, and to personal labor, in the preparation of his designs, besides incurring expenses always incident to such an undertaking; none, however, but the happy few to whom the premiums are awarded, receive any show of compensation, the remaining candidates for the prizes being "left out in the cold," with the unenviable satisfaction of enjoying "their labor for their pains." Architects should let all such competitions severely alone; they are unqualifiedly objectionable in whatever light we may view them; they deprive the public of the use of the best talent in the profession; and they greatly injure all who compete for the prizes, and prove unsuccessful, subjecting them to a worse than useless expenditure of time and brains and money, and often to a greater loss, — a loss of self-respect.

As a general rule, no architect should consent to perform

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professional service without a reasonable compensation. "The laborer is worthy of his reward."

Competition of any kind is no more necessary in architecture than it is in other learned professions; but public opinion being in its favor, it remains for architects to seek to remove, as far as may be, the evils attending it.

The only just and equitable method that appears to be practicable to obtain competitive designs for a public work, is for the authorities intrusted with its management to select a given number of architects, and to extend to each a special invitation to furnish designs in competition, under a schedule of graded premiums, corresponding in number with the competing architects; care being taken that the lowest premium is sufficient to cover the expense of producing the design, so that no competitor could be an actual loser by the operation.

In all such competitions the drawings should be made to a similar scale, and finished without coloring. After their reception by the building committee or commission, they should be submitted to a board of experts, consisting of at least *three* non-competing architects of acknowledged proficiency in the science of architecture, selected from the Fellows of the American Institute of Architects, and *two* civil engineers of undoubted skill in their profession. The board of experts thus constituted should examine the several designs; and whatever decision they arrive at, as to their relative merits, should be considered as final; and the competitor receiving the highest premium should be appointed architect of the building at the usual rate of compensation for his services.

By thus limiting competitions to a given number of selected architects; by referring the designs they submit to a board of experts of acknowledged skill; by awarding graded premiums, according to merit; and by appointing the competitor who receives the highest premium the architect of the proposed work, — the evils of competition may, in a great measure, be avoided.

The propriety of using our best efforts to bring about the establishment of a system somewhat in accord with the suggestions I have here ventured to make, cannot be doubted, in view of the fact that committees or commissions who usually have the management of our public works have, with but few exceptions, no knowledge whatever of the fitness of an architectural design for the purposes for which it is intended. They are in most instances, it is true, gentlemen of respectability, of general business qualifications, and of intellectual culture; but it is equally true that few, if any of them, have ever given architectural science the least intelligent attention. However unexceptionable they may be in their daily avocations, and whatever business tact they may have for conducting a public work, they cannot be expected to be capable of passing judgment on the merits of architectural designs, either as it regards the purposes for which they are intended, their æsthetic properties, or their principles of construction. It is therefore not only proper, but highly necessary, for all such committees or commissions to call in scientific skill to lead them in their decisions on matters so vitally connected with the well-being of society as the architectural fitness and propriety of its public edifices.

A correction of the evils which exist in the present methods of competition is rendered difficult by the want of a proper appreciation by the general public of what is due to the profession: the subject is one to which the Institute would do well to give serious consideration.

Permit me to allude to another subject that materially concerns the well-being of our profession: I refer to the propriety of cultivating a higher degree of professional etiquette among architects, the practice of which would undoubtedly lead to a better understanding of our art by the public, and to a higher appreciation of its professors. Very many architects, otherwise highly respectable in their calling, seem to be impelled by some irresistible power to criticise unsparingly the works of others. This is a most pernicious practice for any one to indulge in. To detract from the merits of the works of fellow-professors, in one of the noblest arts of civilization, cannot fail to lower the standard of the profession in the public estimation.

We designate our practising members *Fellows* and *Associates:* we mean by these terms, a vital principle of professional life; they imply *fellowship*, — not *enmity*. They mean in this connection, union of purpose in promoting the interests of the profession, and elevating it to its proper place in the public mind.

As to our individual ideas of the æsthetic handling of architectural subjects, these will necessarily be as different as our tastes, our cultivation, and our habits of thought, are different; but it is neither generous, modest, nor graceful for an architect, however eminent he may be in his profession, to detract from the works of others simply because they do not square with his own ideal standard.

Our late president, whose words of wisdom and sound logic have ever been grateful to us, said in his address at the opening of the First Annual Convention of the Institute, —

"We complain, and sometimes justly, of the irrelevant, and to say the least, disreputable criticisms of others. I say this because mere loose observations and remarks strike at the reputation of others, and sometimes do great and lasting injury to them. If we cannot speak in commendation of another's work, we will say nothing." Such words as these, coming as they do, from the Nestor of American architecture, are, in the language of Solomon, "like apples of gold in pictures of silver." Let us heed them.

In conclusion, gentlemen, permit me to say, that although the American Institute of Architects is complete in its organization, and its work thus far has been admirably done, we must bear in mind that *art* is progressive, that *we* are progressive, and that the *Institute* is, or ought to be, progressive: the work of to-day will not exonerate us from the work of to-morrow.

One of our most effective movements in the line of progress has been the establishment of local Chapters; but these must be sustained and encouraged, their membership increased, and their number multiplied, until all the centres of civilization throughout the land shall send to our annual gatherings representatives of similar branches of the Institute, alive with the energies of art, and imbued with the universal idea of progress. My own opinion is, that an important branch of our future labors will lie in this direction.

In a country of such vast extent as ours, we could not have succeeded without Chapters; they are the life-blood of our organization, vitalizing our existence, and imparting to it breadth and dignity. We are all members of chapters, as we are members of the Institute. By this dual relationship we are brought into harmonious accord, a spirit of emulation is promoted, and our extended and diversified interests are unified under a federal head. We have therefore important work to do in our respective bailiwicks, to which it becomes us to devote our best energies.

The respectability of the profession has already been greatly promoted by the establishment of the Institute, and we have a full share of the public confidence; if, therefore, we are true to our interests, it will not be long before we become a necessity of the age, and an honor to our country.

NEW PUBLICATIONS.

METALLURGICAL REVIEW.[1]

THE first number of this review (for September) is before us. It is admirably printed on clear, substantial paper, generously illustrated, and discusses, in a series of well-considered papers, a class of topics of the highest interest to the profession to which it is specially addressed.

The opening paper, by Professor Thurston of the Stevens Institute, on the mechanical treatment of metals, including hydraulic pressure applied to fluid metal in casting, rolling and forging, drop-forging, hydraulic forging, wire-drawing, — with and without annealing, — with the details of special improvements, and of the author's own experiments, is full of most useful matter. In some future number of the series of papers, of which this is the first on these topics, we shall doubtless see allusion to Professor Treadwell's researches in increasing the strength of metal for guns, a bit of credit we looked for under the head of "Rolling and Forging," or of "Wire-Drawing." This paper is followed by the carefully-prepared communication of Mr. Pechin on new iron-fields in Ohio, which promise the greatly cheapened production of pig-iron; and next by a paper on the Danks Furnace, by a practical furnace man. Mr. Williams points out the excellences and defects, and mentions his own improvements, while vindicating the importance of the invention.

The article on steel brings to notice the vexed problem of the dependence of particular properties of steel and cast-iron on the minute shades of difference in the percentage of carbon. Mr.

[1] METALLURGICAL REVIEW: a monthly journal devoted to subjects indicated by its title, published by David Williams at 83 Reade Street, New York.

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Metcalf is a practical worker of steel, and treats the subject in the style of an expert. His remark that "Every variation of one-tenth of one per cent (in the carbon) may be observed, and in high steels a difference of one-fortieth," in the properties of the steel, is fully sustained by the analytical results of Professor Langley, presented before the chemical section of the American Association for the Advancement of Science at its Buffalo meeting. The paper is full of interest.

An improved method of determining phosphorus in steel and iron is given. The deleterious influence of this impurity is so well known, that a method of increased accuracy will be welcomed by analytical chemists. There are other lesser articles, as that on "The Siphon Tap in Lead Smelting," "The use of Alloys of Silicon and Manganese in Casting Steel," "On Protection of Lining of Blast Furnaces," and several others that will not fail to interest the profession. The most original paper in the number is that of Henry Wurtz, Ph.D., "On Elemental Iron and its Modifications." It is full of suggestion, and will be read with warm interest by students of the anomalies which present themselves to iron masters. We shall look with interest for the succeeding numbers, which are certainly promised in the large amount of work cut out in this paper, which the author calls introductory.

MAHAN'S INDUSTRIAL DRAWING, NEW EDITION.

MAHAN'S INDUSTRIAL DRAWING is a book too well known in architects' and engineers' offices to need description. In this new edition Professor Thompson has successfully endeavored to modernize certain portions which were beginning to appear antiquated, and to make the work more complete by additional material. New chapters are added on Tinting and Shading, Shadows, Isometrical Drawing, and Linear Perspective, besides two short and not very valuable chapters on Oblique Projection, and Construction of Regular figures; the regular figures consisting of various kinds of pavements, which might apparently be quite as well drawn by the application of ordinary methods. The chapter on Drawing Instruments is re-written, and includes descriptions and illustrations of the latest improvements in materials, which are selected and commented upon with excellent judgment; and in the chapter on Tinting and Shading there is much that is useful and practical. The new chapter on Shadows is clear and concise. Both in this and in the portion of the book which treats of projections, which has been altered from the earlier editions only by re-arrangement and the omission of a little unimportant matter, a change for the worse has been made in the notation, so that small Italic letters in the plates refer in the text sometimes to capitals and sometimes to small letters.

The chapter headed Isometrical Drawing starts with two or three pages on Isometric Projection, which we are told at the end is quite a different thing from isometric drawing, and then stops to compare this with the true projection of isometrically projected figures, which is different from either; and when after all this misplaced geometry we arrive at the real isometric drawing, we find what we should have known at the beginning, that it is a purely conventional method of delineation, having nothing to do with ground lines or vertical planes. Once reached, the problems are well arranged. The chapter might with advantage be longer, and should be carefully cleared of any thing tending to obscure the rules of so simple and so extremely useful a mode of drawing.

The chapter on Linear Perspective opens with a short and clear explanation of the theory of perspective, followed by a variety of easy problems, worked out by means of the vanishing points of diagonals and perpendiculars; an easy method to understand, and perhaps the best which can be adopted in dealing with small and simple objects. The problems are worked out clearly, and with a judicious progression from the easier to the more difficult; though the editor does not attempt to carry his readers beyond the simplest forms.

The illustrations seem to be lithographic reproductions of the original copper-plates, with several new plates added. They are coarsely printed, and the drawing of some of the new plates is far from good; as for instance the interlacing circles and guilloche ornaments in Pl. I ** which are but poor models for the student; and a figure in Pl. XXV., in which the perspective representation of a hexagon is made to have seven sides.

The print is clear, and the form of the book convenient, as the plates are bound in a separate pamphlet, inset into the volume of the text.

THE ILLUSTRATIONS.

EXTENSION OF THE CHENEY BLOCK, HARTFORD, CONN. MESSRS. GAMBRILL AND RICHARDSON, ARCHITECTS.

THIS extension, of brick, is connected with the block, which is of stone, but similar in style, by the bridge in the second story, shown on the right of our plate. The original design of the block was illustrated in the *New York Sketch-Book of Architecture* in 1875.

SECTION OF A STAIRCASE HALL. MR. W. P. RUSSELL, ARCHITECT.

This hall is in a building for Mr. A. Williams, at Charleston, S.C.

SKETCH FOR A FARM BELL-COTE. MR. T. P. CHANDLER, JUN., ARCHITECT.

MONUMENT IN FOREST HILLS CEMETERY. MR. W. WHITNEY LEWIS, ARCHITECT.

The monument is to be of white granite, certain parts of which will be polished.

THE JEWISH SYNAGOGUE AT TURIN. CAV. A. ANTONELLI, ARCHITECT.

See article in another column by Mr. R. P. Pullan. Both article and illustration are copied from the *Architect.*

CORRESPONDENCE.

PHILADELPHIA.

THE new Post Office progresses very slowly, as the labor force is small in comparison with the extent of the work. Only about eighty hands, principally the brick-layers who are laying the inner walls and backing up the external granite, of which almost the entire first story is laid, are at present employed. The granite work for the second story has nearly all been delivered on the premises, ready to be set, the cutting being all done at the Dix Island quarries. Mr. McArthur, the superintending architect, considers that the work might be completed within three years if the necessary appropriations could be depended upon. It is to be hoped that the new Congress will take early action on the deficiency which has been delaying the work, as it has been shown that the appropriation for the current year of $400,000 will not carry the building on to the point intended when the appropriation was made.

There was to have been a meeting of the Public Building Commission on Tuesday (16th) evening; but it was found necessary to postpone it until the last Tuesday of the month, on account of the lack of a quorum. Meanwhile the work on the actual building is at a stand-still, as it has been since last July, while in the quadrangle and outer enclosure is lying almost enough marble to complete it.

It is a curious feature of modern civilization that such time-honored landmarks as churches and grave-yards are made to give place to the requirements of business. A recent example of this is the old Central Presbyterian Church, a large building with the stereotyped Doric façade, one might almost say, without which, during the early part of the century, no church-building appears to have been considered complete. Here, as in many like instances, the congregation has been driven out of the neighborhood by the encroachments of business, and finally the church "goes west" after them; and at the same time its dead are packed off farther west to one or other of the suburban cemeteries. The new church-building, the design of Messrs. Collins & Autenreith, is located on the west side of Broad Street, north of Fairmount Avenue (formerly Coates Street), having a frontage of 84 feet and a depth of 140 feet; the back part of the lot impinging on the properties fronting on Ridge Avenue, gives an irregular angular plan to the Sunday-school and class rooms, which are in the rear of the church proper. The façade will be mainly of Trenton sandstone, with base course of Hummelstown stone; wrought-work of Ohio drab and brown stone; the roof-cornices of galvanized iron, and the tower-roofs slated; while the roof of church, being of a low pitch, will be tinned. The front shows three ample central doors, the heavily carved and crocketed canopies over which are supported by six polished granite columns from the Bay of Fundy. Above these is a broad triple window under separate arches supported by similar polished granite columns. The gable above is pitched at a rather low angle, and the decoration of the cornice, as also of the tower-cornice, is in galvanized iron. The front is flanked by towers on either side, that on the south being dwarfed, of three stages, and having a sort of truncated pyramidal roof. The tower on the north side reaches with its short spire, a height of 115 feet. The interior will allow an auditorium of 75 feet by 51 feet. The seats will be arranged on a theatral plan, and with the semicircular gallery will allow of somewhat over nine hundred sittings. The organ will be above and behind the pulpit. The general style of the work, especially the arches and mouldings, is Romanesque.

Meanwhile on the lot which was lately occupied by the old church at the corner of Eighth and Cherry Streets is building from the same architects' plans a group of five new stores, allowing a frontage on Eighth Street of about 17 feet 8 inches to each. Two alternate stores finish above with a pediment, while a portion of the corner-store runs up a story higher than the others in the wall, besides having a pyramidal roof above, which gives a certain unity of effect to the composition, while each store to a great extent preserves its individuality. The first stories are much the same as usual all along that thoroughfare of retail shops for the sale of dress goods; the old story of plate-glass set in the slightest frame-work of wood. Delicate columns and pilasters with incised patterns

[1] Industrial Drawing, by D. H. Mahan, late Professor of Civil Engineering, etc., in the U. S. Military Academy. Revised and Enlarged by Dwinel F. Thompson, B.S., Professor of Descriptive Geometry in the Rensselaer Polytechnic Institute, Troy, N.Y. New York: John Wiley & Sons, 1877. Price $3.50.

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seem to support the walls above, which are of red pressed brick, with window heads and sills of Ohio drab stone, the heads having an incised ornament. Two string-courses of enamelled brick are introduced; and just below the galvanized iron cornice a more elaborate arrangement of the same bricks will be used, the colors being chiefly blues and browns. The interior of these stores will be arranged with a broad central stair at the rear, opening to a gallery, above which a sky-light and an ornamental window in the back wall will afford ample light to that portion of the building. Some new features for stores of this class are being introduced, such as ample toilet-rooms and dumb-waiters. Mr. George Watson is the contractor; and the work is to be completed by the first of the year, much to the relief of the locality, the streets adjoining being a trifle too narrow to conveniently accommodate the necessary encroachments of brick-piles and mortar-beds.

In the case of a mechanic's lien filed against the trustees of the Jefferson Medical College Hospital, Judge Thayer was last week asked to allow it to be amended by citing the trustees of the college instead of the hospital, as a number of names were added to the trustees of the former when the money was being raised to build the hospital, and it was not desired to throw the responsibility on these. He decided that the superfluous names might be stricken out; but would not allow the general change of substituting the one set of trustees for the other.

Fire-escapes have been put on some of the theatres, factories, and hotels; but most of the owners have paid no attention to the law requiring them to be put up, and nearly all of those who have complied seem to have endeavored to come within the requirements of the law at as low a cost as possible, and without much regard to usefulness in the emergency for which they are intended. Most of them are ladders constructed of iron rods or pipes, with an open platform at each story. These are so narrow that it would be impossible for two persons to pass, and those who are not accustomed to such heights (particularly women in the large mills) would be in case of fire unable to help themselves. The Academy of Music, with a few others, have put up a really useful fire-escape; which is a very plain two-feet-wide iron stairway, on the south wall, and leading from the dressing-room to the yard.

Why should not fire-escapes be used, in places where it is practicable to do so, as regular thoroughfares, and then in case of emergency every one would know where to find them, and how to use them?

CINCINNATI.

MR. JAMES K. WILSON, architect, is now engaged upon a monument to be erected in Spring Grove Cemetery for John M. Mueller, Esq., well known as the owner of the Buena Vista (Ohio) freestone quarry. The design has for its model, or at at least is similar to, the temple of Vesta at Tivoli, and will be of the purest Corinthian in design. It is to be built of the best quality of the Buena Vista stone throughout. The rear end will start from the level of the lake, the roadway in front being about eight feet higher. The basement is to be of very large blocks, bedded only, with faces left as taken from the quarry. Above the basement, come the sixteen columns, twenty inches in diameter, and ten diameters high, fluted and resting on pedestals with balustrades; between the columns and the pilasters of the wall will be a footway three feet wide. The ceiling above these columns will be panelled. The diameter of the monument, taken at the columns, is twenty-five feet. The "cella" is twelve feet in diameter inside, in which is a circular stone stairway, communicating with the several stories. The entablature carries a balustrade upon which is another walk, or gallery. The "cella" is a full story above the order, and admits of another gallery from which a commanding view of the surrounding country may be had. The entire height above the lake, to the top of the statue that crowns the dome of the cella, is about a hundred feet. The catacombs, of which there will be thirteen to each tier, are of course in the basement, which is rectangular in plan.

THE JEWISH SYNAGOGUE AT TURIN.

[From the *Architect.*]

TURIN, though a comparatively modern city, and one without a history, is not utterly destitute of attractions for the artist and archæologist. The artist, however, plods through its uninteresting thoroughfares, despairing of meeting with any building likely to produce a sensation of wonder, admiration, or even to excite his curiosity. Still even he need not go away disappointed; for if he will follow the Contrada del Po from the Piazzi di Castello, and take the second turning on the left, he will see towering before him a building which will render him breathless with amazement, — an edifice of brick, as yet unfinished, almost in a line with the front of the street, rising to a height of more than 240 feet, and apparently of such slender constructions that he will almost expect to see it fall while he gazes. When I first saw it three years ago I never expected to see it again. Yet it was commenced fourteen years ago, and has remained in its present unfinished state for about seven years, exposed to the elements; and up to the present moment has shown no signs of failure.

This extraordinary edifice was intended for a synagogue; but the Jewish community having exhausted their funds when the building was 124 feet short of its intended height, — 367 feet from the level of the pavement, — it has lately been sold to the municipality of Turin, and is to be turned into a museum. I visited every part of it in company with the Jewish custode, in whose charge it still remains. I came away convinced that as perfection in building consists in the attainments of the greatest results with the utmost economy of materials consistent with stability, this edifice approaches perfection in the science of construction more closely than any other in existence. Forty-eight piers about four feet square sustain a superstructure 130 feet square in plan and at present 240 feet in height. Thus the bases of support are of the smallest possible dimensions when compared with the superincumbent weight. Then, again, the mode of construction is "hardi" in the extreme; the roof is what may be called a four-sided dome. As to the architecture, it will not do to be hypercritical; for we know from sad experience that engineers' architecture is none of the best. There is not much to find fault with in the elevations. The plan is a square of about 130 feet. There are two main horizontal divisions in the fronts and sides of about equal heights when measured from the gutter of the lean-to roof which covers the lower division. The height of each is about 75 feet. The lower division has two orders of composite pilasters, with cornices and entablatures. There are eight pilasters on each face. On the near front there is a portico of six columns, approached by flights of steps at the sides. Below these divisions there is a basement. The spaces between the pilasters of the lower order are occupied by two ranges of windows. In the upper order there is a loggia, which has a light and pleasing effect. Above the lower division there is a lean-to roof running back about five feet. Over this roof there is the basement of a second loggia, which is to run round the building, and to have eighty granite columns, not yet fixed. This loggia is covered by a second steep lean-to, above which there is an attic with five semicircular arches between pilasters on each front. The cornice over these pilasters forms the line of the springing of the four-sided dome, at the height of 150 feet above the ground-line. This dome, which is extremely steep, is covered with plates of metal, apparently zinc. When completed it is to be surmounted by three cupolas, one above the other, measuring 100 feet in height.

In order thoroughly to comprehend the plan of the building, it will be well to draw a plan on paper, and to divide each side into eight parts, connecting the opposite points with lines, and thus forming sixty-four squares. Rub out the four interior points on the third and sixth lines, and draw lines to represent the external walls, and you will have a plan of the basement, ground, and first floors; each of these stories measures 17 feet 6 inches in height from floor to floor. The foundations for the piers, which are represented by the points on your drawing, are composed of tiles and puzzolana, and are carried down to a depth of 45 feet in a heavy sandy soil. The basement was to have been occupied by kitchens and offices; the ground-floor by a hospital and schools; the first floor by council-rooms for the rabbis. Each floor is sustained by the flattest vaults of brick-work ever seen; those of the two inner compartments are at least thirty feet in span, with a rise of less than three feet. These vaults are all strengthened by wrought-iron ties running through the building, on the upper surfaces of the brickwork. Massive granite staircases in the angles of the building lead to the second story, that of the synagogue itself. The landings are of granite, and of enormous size. I measured one thirty feet in length. The synagogue occupies the entire area of the square, the only piers being those at the sides which support galleries and the walls of the superstructure. This room is the highest in the world, being, although unfinished, 200 feet in height. Although the entire space is encumbered with scaffolding, the spectator when looking upwards is struck with amazement at the grandeur of the conception, and at the boldness of the construction; for he perceives that the dome is sustained by three rows of slender columns, six on each side, which stand upon the outer piers supporting the galleries.

Mouldings and other ornamental features are still wanting; but this is an advantage to the visitor, if an architect, for he is thus enabled to study the skeleton of the structure. The corridors which run round the inner area are vaulted, at the same height as the lower stories; viz., 17 feet 6 inches above the ground. At this height there is a series of flat arches, supporting the fronts of galleries for the women. On the piers which support these arches, there are Corinthian columns with entablatures ranging exactly with the upper pilasters on the exterior of the building. Between each column and outer pilasters there is a parabolic arch. From the sides of these transverse arches spring the rows of elliptical arches, running longitudinally round the square; and upon these rest two walls, — one, that of the basement of the upper loggia; the other the outer wall of the building, which supports the outer wall, or rather shell, of the dome. This is the peculiarity of construction before mentioned, — the upper main wall of the building thus rests upon a system of arches, and has no direct support from below, with outer and inner walls, or rather shelves, of brick. The inner shell, which is only half a brick in thickness, rests upon six columns on each side, and the outer shell on a wall which has no direct line of support beneath it, but which rests on a series of arches, in a manner which will be hereafter explained. I am con-

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vinced that no committee — had the plans of the building been submitted in competition — no committee, even if composed of architects or engineers, would have ventured to accept this design, so impracticable does its execution appear when the sections are seen on paper. Fortunately, the Jewish community had confidence in the ability of the designer, — the engineer, Antonelli, of Turin; and the result has shown that their confidence was not misplaced, for he has produced a work which proves him to be a man of the highest talent. Nothing but the most accurate calculation, combined with years of experience, would have enabled him to carry out this extraordinary project. I say the experience of years; for this is not the work of a young man, but of an old man of genius — Antonelli is nearer eighty than seventy years of age. We think much of ourselves if we complete a Gothic spire of unusual height, or a vault of great span; but these are but puny works by the side of this gigantic synagogue. In fact, such a piece of construction is simply impossible in England; for in such a building, where the stability of the whole depends upon the most careful workmanship, it would not do to trust to the chance-work of builders, or to the possible negligences of clerks of works. Every brick in the building was set in cement, under the eyes of Antonelli or his immediate representative, who was, I believe, his son. How would such a systematic supervision answer with our five per cent mode of payment? The total cost of the work hitherto executed was the moderate sum of £24,000. What English architect could afford to accept £1,200 for five years' incessant superintendence of any one edifice, however much it might be likely to add to his reputation?

The dome, when seen in section, appears like an imitation of iron-construction in brick-work. It consists of two coverings or shells, five feet apart, the outer one brick thick — the inner only half a brick. Both of these have, however, inner ribs at short intervals. These shells are connected by what may be termed bonding arches, with stone heads, placed one above the other vertically, about twenty feet apart; and from them again spring longitudinal arches. The inner shell is strengthened by ribs a brick and a half in thickness, which rise from above the columns, and form acutely-pointed groining arches intersecting one another. Thus the whole dome is kept together by a complicated system of circulation. In addition, it is secured at the angles by iron ties, which connect the inner-angle pier with the two outer-angle ribs, and by longitudinal and transverse ties which run round the entire building and between the main points of support. Between these two shells a series of ladders will give access to the cupolas above the dome. At present, in order to reach the platform on the present summit of the edifice, it is necessary to ascend by the scaffolding in the interior. This is in no wise a perilous undertaking, and you are well rewarded for the toil of the ascent by the fine view of the city which you obtain, and by the opportunity thus afforded of examining the peculiarities of the construction. The custode informed me with a sigh, that his co-religionists, being unable to complete the synagogue, had lately sold it to the municipality for £6,000, quite a fourth of what it cost them, and that Antonelli was to have the satisfaction of completing his great work. Let us hope that he may live to see the completion of this, — one of the greatest works of genius the world ever saw.

R. P. PULLAN.

THE PARIS INTERNATIONAL EXHIBITION.

"THE progress in the works is so great," says a writer in the new English journal, *Trade Marks*, "that there is little doubt all will be finished in good time. Already our own and other commissions have possession of portions of their space. By the system of construction adopted, no sooner is a bay or section finished than it is roofed in, and as the window-frames are tinned, the labor of painting them is happily dispensed with. The various sections are all now distinctly visible, and the plan is remarkable in many points, — the first being that all the galleries present long vistas, with great width and height, whilst the arrangement of the parts is the simplest possible. In front, that is to say, facing the river, is a building which occupies the whole width of the site, and at the back is a corresponding building. In these are the principal entrance doors, and with one exception all the other exhibition-galleries connect these two together; consequently the latter form grand vestibules to the former. The plan is like that of the Escurial in Spain, — gridiron-shaped. The exception referred to is that of the fine-art galleries, which are not continuous, but form a broken line of handsome pavilions down the centre, with flower-beds between and around them. The advantages of the plan seem to be these: The machinery-galleries — the only section in which fire is required — are placed on the outside; next to these come the general galleries, occupying an immense space on each side; while the fine-art pavilions are not only isolated from each other and from the industrial galleries, but have a considerable space on each side between them and the latter — a capital safeguard against fire. This enclosed garden, with a very long arcade, and decorated façade on each side, French and foreign, will form a charming nucleus to the whole. Architecturally speaking, the coming Exhibition will far surpass any of its predecessors. The chief façades are very handsome, as are those in the garden already referred to. At each end of the fine-art pavilions are remarkably bold and handsome peristyles, each surmounted by three cupolas; these will protect the contents of the pavilions from dust, and, in a measure, also from heat and cold.

"The fine-art pavilions do not, however, occupy the whole of the central portion; the building in the middle, a large and handsome one, being devoted to the exhibits of the municipal authorities of the Department of the Seine and the city of Paris. The contents of this building will have great attraction for all who are in any way engaged in local government, as it will illustrate all the measures taken during more than a quarter of a century to change Paris from what it was to what it is at present. This collection will include models, plans, apparatus, and materials relating not only to operations connected with draining and sewage, road-making, keeping and irrigation, and the water supply, but also to common schools, colleges, schools of art, barracks, hospitals, infirmaries, and other public establishments of all kinds; while in the garden will be shown the various foreign plants specially cultivated for the decoration of the parks, squares, and promenades, which form such prominent features of Paris. The Municipal Exhibition is not to be limited even to these matters. For many years the authorities have had medals struck in commemoration of the erection of the principal new buildings. Thus there are medals of the Halles Centrales (the grand market of Paris), the new churches, the Tribunal of Commerce; the last two added to the collection being commemorative of the Church of St. Peter, erected at Montrouge, and of the reconstruction of the Palais de Justice, while one of the new Hôtel Dieu will be added this year. The archives of the municipality and the hospitals are to contribute historic documents, old maps and plans, seals, illuminations, miniatures, autographs, etc., of which the selection is now being made of the most rare or curious for exhibition, either bodily or by photograph. The Government has also sanctioned the necessary expenditure to enable the directors of the Meteorological Observatory, established within a few years at Montsouris, to fully illustrate the methods of observation adopted there, and to show the instruments and apparatus used in that important establishment.

"All who are connected with art industry in any way will rejoice that the Union Centrale, which has organized several of the most splendid exhibitions of specimens of industrial art ever offered to the public, is to have its special department, which will contain drawings, plans, and works in sculpture, to which prizes have been awarded since 1869; the art publications of the society; examples of old decorated tissues; photographs of ancient costumes, tapestry, objects of art, mostly from the East; also plaster models of geometric figures, architectural ornaments, from the most elementary to the most ornate, reproducing the chief elements of each style and period, and grouped with the special object of art-education, with hand-books used by the professors and teachers of schools of art. The models are being prepared by a sculptor, under the direction of the three secretaries of the Union.

"The works around the Exhibition are proceeding as rapidly as those within its boundaries. The quays are being piled to form solid roads, and, in some places, extended by means of timber structures. The foot-bridge for the public, in place of the Pont de Jena, which is devoted to the Exhibition, is commenced. This bridge is to be made from Passy to Grenelle, and will have support on the Isle des Cygnes, which lies between them. The special railway will run close to the Exhibition, and have a terminus at the Champ de Mars and the Trocadéro. It is being constructed by M. Saint-Yves; the engine and carriages resemble those of a steam tramway. The handsome structure, or Palais as it is called, on the Trocadéro, is devoted to the history of man — one wing being given to the ethnography of the nations beyond Europe, the central portion to the anthropological sciences, and the other wing to the history of art."

BLACKBOARDS FOR SCHOOLHOUSES.

EDITORS OF AMERICAN ARCHITECT.

Would you please inform me through the columns of your paper, or by letter, the best way to make blackboards for schoolhouses, either on brick or lathed walls. Yours,

J. H. CAMPBELL.

CANONSBURG, PENN., Oct. 13, 1877.

[Unquestionably the best kind of blackboard is a thin slab of slate rubbed smooth, and fixed firmly to the wall; when this is thought too expensive, the best substitute we have to suggest is a coating of what is called slate-paint, on the wall, which, for durability's sake, had better be laid on one of the hard-setting cements, — Keene's, or the Teil cement, for instance. Perhaps some of our readers will offer other suggestions. — EDS. AM. ARCHITECT.]

THE METRIC SYSTEM. — The metric system was adopted by Belgium, in 1801; by Holland, in 1819; by Greece, in 1836; by Italy and Spain, in 1859; by Ecuador, Brazil, Peru and Chili, in 1860; by Portugal, in 1868; by the German Empire, and by Columbia and Venezuela, in 1872; by Sweden, in 1876; the Argentine Confederation and Uruguay have also adopted it; in the United States, it was legalized in 1866; and Great Britain, India, and Russia have taken some steps to bring about its adoption.

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NOTES AND CLIPPINGS

THE second report of Gens. Gillmore and Duane, of the Corps of Engineers, members of the Board to examine the foundation of the Washington Monument, will differ materially, it is said, from their first. It will be remembered that last year the Board concluded that the present foundation of the monument was insufficient to bear the weight of the structure when completed. That opinion was based upon certain measurements made by Lieut. Daniel Kingman, of the Engineer Corps, who found that the sinking of the shaft was so serious as to endanger its safety if greater weight were added. It is now reported that, through no fault of his, the measurement was made from the wrong bench-mark, and that there has been really no such settling as was believed. The Board has agreed to report that the monument may safely be completed, if a certain addition is made to secure the foundation. They report that a strong wall should be built around the foundation, from the surface to twelve feet below the present walls, and at least six feet distant at the corners of the structure, and curved or bowed so that the centre of the wall on each side shall be at least twelve or fifteen feet from the monument. The space between the wall and the monument they propose to fill in with a strong concrete of rubble and cement, and believe that this will effectually hold the earth directly underneath the shaft so that it will be firm, and will not slide or sink. The report will be submitted exactly as it was left by the late Col. Kurtz, including his alterations and interlineations.

MAKING HOLES IN GLASS. — There are various methods. One which requires some dexterity, and succeeds only in experienced hands, is to use two sharp steel points. Put one in a vise, point upward; lay on this the glass to be perforated, and place the other steel point over it, and strike it gently with a small steel hammer. If the glass is of good quality, you will soon splinter out a piece so as to make a hollow, which, with care, you may deepen and enlarge until you have penetrated through; but be careful at the last moment. If you want to make a hole in a bottle, fill it well with heavy fine sand, and work outside with the steel point. Another method is to use a steel drill lubricated with thick turpentine spirits, which you may obtain by mixing the ordinary spirits with Venetian turpentine, or dissolving a little rosin in the same. Do not press the drill too much; if in good condition, the turpentine will make it cut almost as well as it will cut brass or iron. A third method is with a diamond drill, which will cut any thing. A fourth method is to use a blunt piece of very soft iron, and put diamond-dust on it; this will become embedded in the iron, and so grind the glass most effectively. A fifth method, especially adapted for large holes, is to place a piece of copper tube on a lathe, and use oil and fine emery in its open extremity; this will become embedded in the copper, and it will grind a circle in the glass, which, going deeper and deeper, finally cuts out a disc a little smaller than the interior diameter of the tube; but when you are half way through, begin on the other side also, so as to avoid, if possible, splintering, when going through from one side only.

STRANGE PHENOMENON IN A WELL. — Situated about four miles south-west of Clintonville, Venango County, is a well which, for volume of production, surpasses any thing yet discovered in that county. The well was completed upward of a month ago. No oil was found; but an immense gas-vein was encountered at the place where oil was expected. Before abandoning the well, the owners resolved to draw out the casing. This was attempted in the usual way, but the casing stuck about a foot above its former resting-place. As it was elevated to its present position, the fresh water from the upper part of the hole rushed into the well at the bottom of the casing in great quantity. As it did so, the gas raised it to the surface of the earth after sending it forty feet above the top of the derrick. There it continues to gush, and may for all time. It is estimated that at least twenty thousand barrels of water are thrown out daily. It is truly a remarkable phenomenon.

REMARKABLE CLOCKS. — In the sixteenth century there was at Gaza a clock on which the hours were represented by twelve brass eagles ranged in a row, and each holding a crown. At the end of the hour a silver figure which impersonated Hercules issued from a little temple, and received upon its brow one of the crowns. How the eagle recovered the crown is not stated. This is not so remarkable as a clock which was one of the three wonders of Mechonar, in Arabia, the residence of the Caliphs of Tlemoen (?). The principal feature of the clock was a silver bush at the foot of a wall, also of silver, which supported a colonnaded wall pierced by twelve doors of a like size, and two larger doors. At the top of the bush a bird covered with its wings two nestlings, while a serpent issuing from the foot of the bush was ready to mount to the nest. The whole composition was topped by a sphere, which represented the moon, and which moved in a circle in conformity with the phases attributed to it by the Arabic astronomy. At the end of the hour soft music was heard; two eagles, each holding in its beak a copper ball, flew out from the two large doors, and dropped the ball into a silver bowl with a hole in the bottom. Urged by their weight the balls disappeared within the clock; and immediately the serpent, vitalized by the action of a spring touched by the balls in their descent, moved upward, hissing as he went, to attack the nest. The mother bird fluttered its wings and uttered cries of distress; whereupon the twelve doors opened, and from each came forth a female figure bearing a book, upon whose pages were written an Arab poem in honor of the Caliph.

SPIRAL *versus* SPINAL. — At a recent meeting of the Boston Society of Architects, a member repeated the remark of a lady, who had gravely stated to him that of all modes of ascent she preferred a *spinal* staircase. This called forth from the Treasurer, the comment that the lady had only been misunderstood, for she had meant, probably, a back staircase.

IMITATION TERRA-COTTA. — The *Magasin Pittoresque* gives the following original recipe by which, it is said, plaster casts may be made to imitate terra-cotta ware with great fidelity. The following colors are necessary: brick red, lamp-black, zinc white, and yellow ochre, all in powder. The object to be treated is first carefully rubbed over with "0 0" sand-paper, so as to remove all roughness of the surface or ridges indicating where the parts of the mould have been joined. The mixed color consists of yellow ochre two parts, brick red two parts, and black one part. These are well rubbed together. Then three parts of zinc white are separately mixed with a little milk to a paste. All the ingredients are then combined in a mortar with eight or ten parts of milk, and the resulting mixture is passed through a fine sieve to remove any particles of the white. A soft brush is then used to spread the stain over the object, care being taken to lay it on evenly. After twenty-four hours' drying, a second coat is applied. When the article is completely dry, rubbing with the finger will eliminate brush-marks.

SAWDUST IN MORTAR. — The following successful experiment is reported. A Frenchman is to be credited with a discovery that if mortar is likely to peel off, the tendency can be prevented by substituting sawdust for hair in the original mixture. He had previously tried in vain to make mortar that would stay in place on a building exposed to damp winds near the sea-shore. After frequently renewing the mortar in the old way, he tried the use of sawdust in place of hair, and was quite successful. The sawdust had been thoroughly dried, and its coarser portions were removed by sifting.

FIRES IN CHICAGO. — During the past month there were thirty-nine fires and four false alarms. The causes were: Accidents, 2; carelessness, 5; children, 3; defective chimneys, 4; gas-explosion, 1; incendiary, 4; lamp-explosion, 4; spontaneous combustion, 1; rats with matches, 1; kettle boiling over, 2; unknown, 1. The total loss was $23,620, — $13,327 on goods, and $10,923 on buildings. The total insurance was $102,800. The largest fire occurred in the Union Planing-Mill Company's mill, and the loss was $8,570 on both goods and building.

A BUILDING ASSOCIATION, LIMITED. — A novel building association has been formed in Mechanicsburg, Penn. It embraces a membership of but five persons; viz., a lumber-dealer, a brickmaker, a carpenter, a mason, and a plasterer, each individual member furnishing his portion of the necessary material and mechanical labor for the erection of five houses, each taking a house as a remuneration for his services.

ARCHÆOLOGICAL DISCOVERIES. — At Trier, the ancient *Augusta Trevirorum*, which was one of the last places captured from the Romans by the German Franks, a great number of marble slabs, fragments of statues, and frescos, have been brought to light by recent excavations. Near Trier is a colossal Roman family monument, 72 feet in height, which is known as the Igel column.

A DEEP WELL. — A proposition was lately brought before the Brighton (Eng.) Board of Guardians to abandon the well-known Warren Farm Well, one of the deepest dug-wells in the world. It was commenced on the South Downs above Brighton in 1858, and after four years' persistent digging, water was reached at a depth of 1,285 feet, the shaft being six feet in diameter down to 400 feet, and four feet for the remainder. The operation, which cost between £6,000 and £7,000, and was watched with the greatest interest by geologists, was carried out with a view to supplying the industrial schools with water, and thus saving the town the cost of such a supply from the established water company.

HOUSE VENTILATION. — A series of experiments has just been made in Liverpool in a new method of house ventilation, which has been patented by Mr. John Westmoreland, of that town. The ventilator is an iron frame, which fulfils the double purpose of a ventilator and hearth-bearer. The object obtained is the rapid extraction of air from its position in the ceiling of a room. In the presence of the company interesting experiments were made; and, with the windows and doors closed, by the application of an anemometer to the extraction flue, it was shown that it registered 560 cubic feet of air per minute, which was equivalent to changing the entire atmosphere of the room every six minutes. With the door open, allowing greater inlet, the anemometer registered 1,440 feet per minute, equivalent to changing the entire air of the room in three minutes. In this room a brisk fire was burning at the time. There were other experiments made in the library without a fire, when the anemometer registered 320 cubic feet per minute, being equivalent to changing the air of the room every five minutes.

MORE BAD WORK. — The Philadelphia *Bulletin* says that Peoria is another Illinois town having a court-house and a dome. The architects recently ordered an investigation into the condition of the walls. The dome wall was found to be a shell from four to eight inches thick, the interior being filled with débris, brickbats, and lumps of stone and mortar. The main walls, which were from two to three feet thick, were found to be packed with rubbish, most of the brick being so soft that it could be sliced with a knife or crushed with the fingers.

CHRIST CHURCH, BOSTON. — One of the objects of interest in the city is the old Christ Church on Salem Street, the oldest church edifice in Boston. Among the old-time relics in the church are the Bible, prayer-books, and silver given by George II. in 1733, which are still in use; a chime of eight bells brought from England in 1744, and which is the oldest chime in this country; the figures of cherubim in front of the organ; and the chandeliers, taken from a French vessel by a privateer, and presented to the church in 1746.

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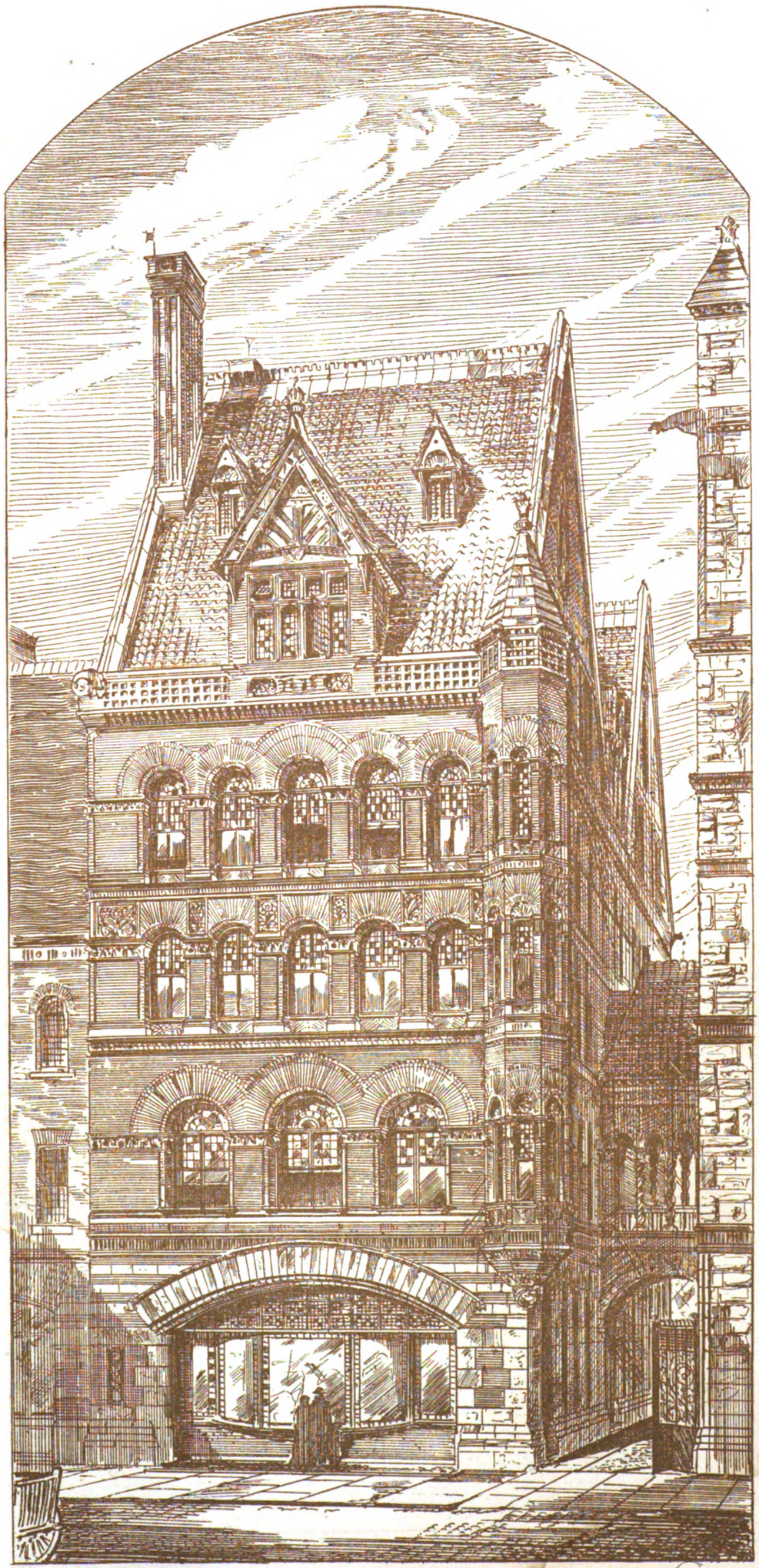

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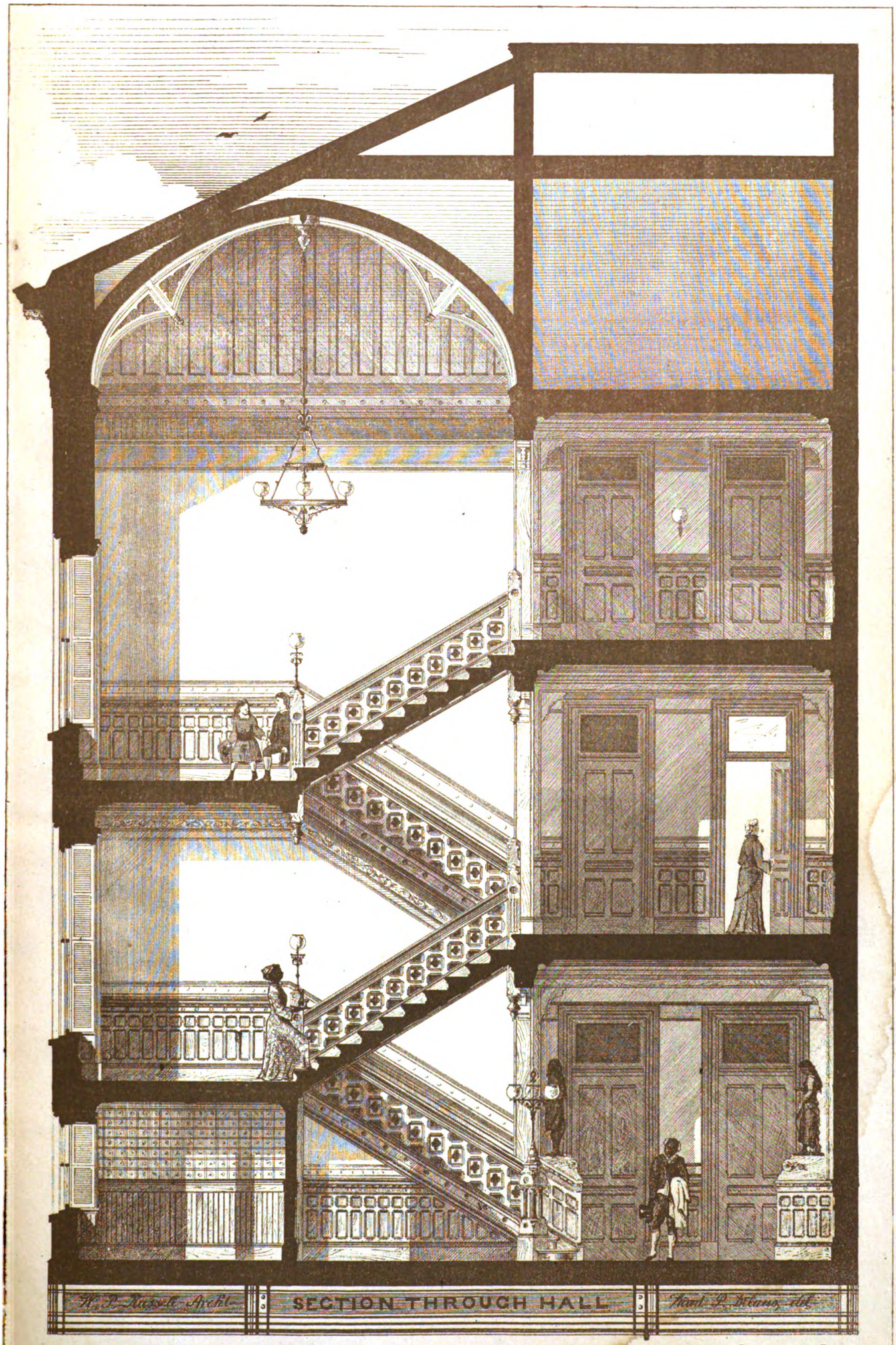

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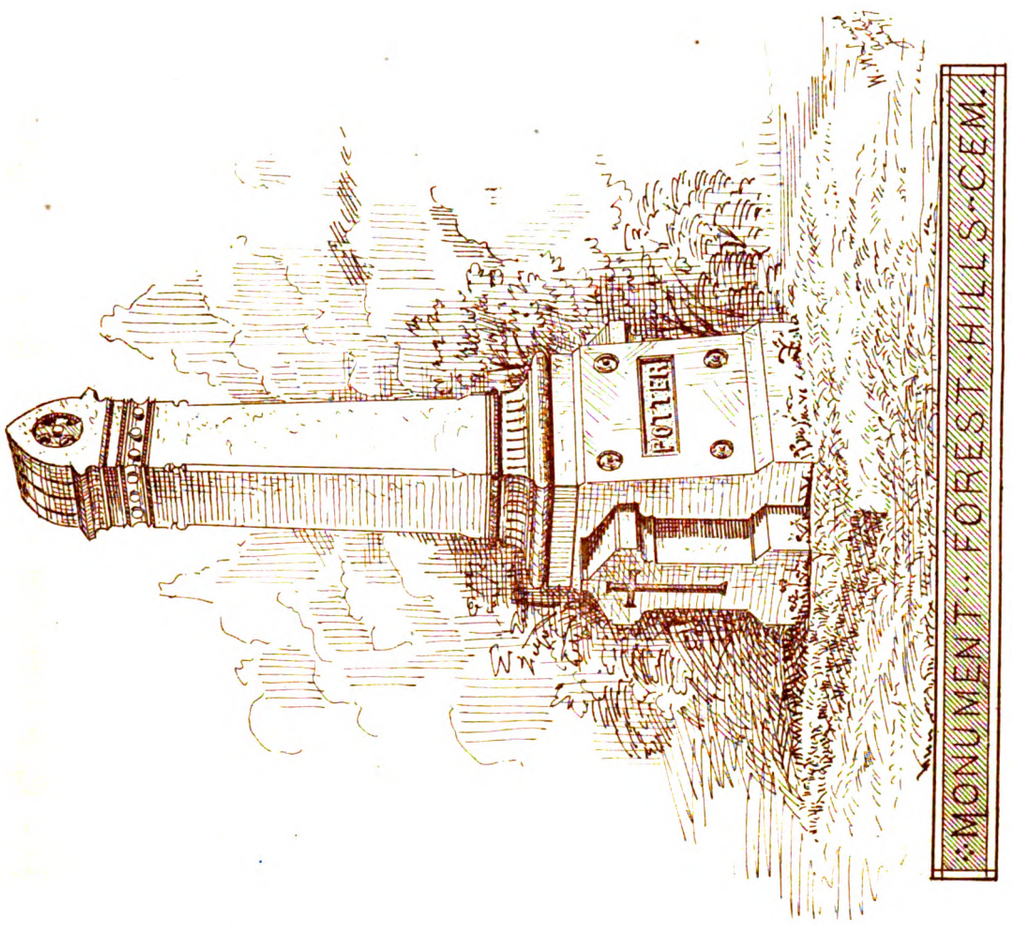

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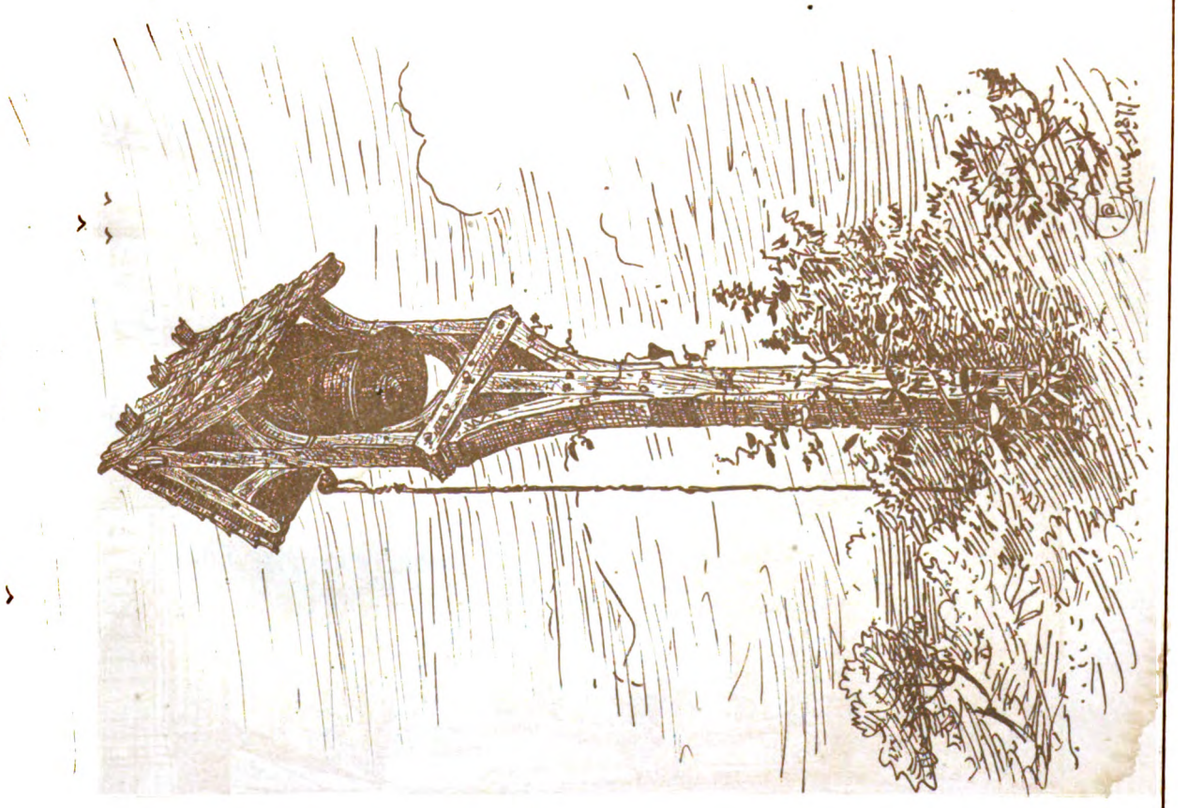

FARM BELL NEAR PHILADELPHIA.

THEOPHILUS P. CHANDLER JR ARCHT

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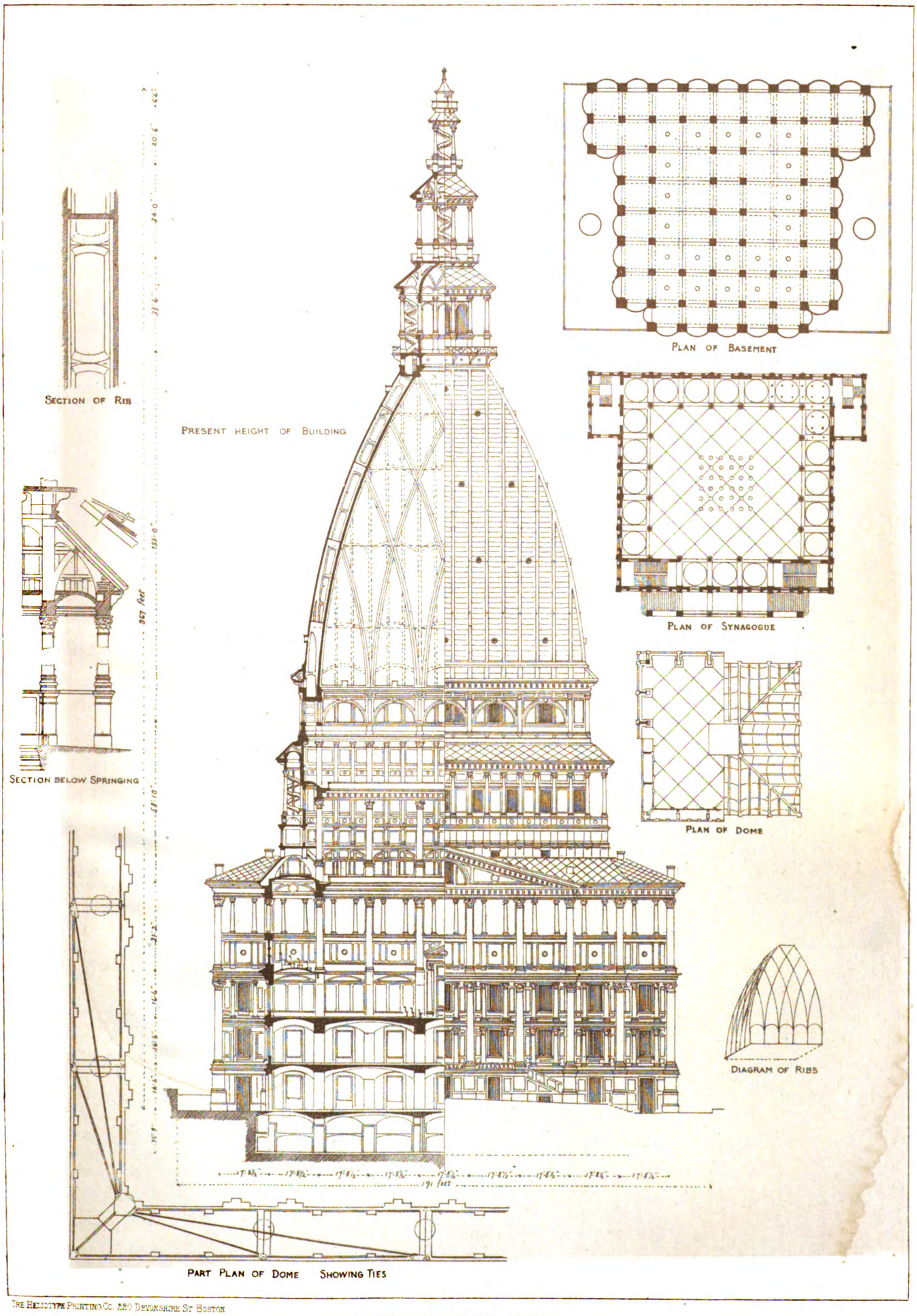

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JEWISH SYNAGOGUE TURIN

CAV. A. ANTONELLI ARCHT

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, NOVEMBER 3, 1877.

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THE Commission appointed after the Patent Office fire to examine into the security of the public buildings in Washington have made a report, in which, after saying that all the public buildings except the new State Department are more or less endangered by their construction, they urge the need of a new fire-proof building for a general record-office, to which all the records of the Government can be transferred that are not needed for constant reference in their respective departments. The building, they say, should be so set apart from other buildings as not to take fire from them, and so planned as to admit of indefinite extension. They propose brick as the only fire-proof material, without claiming that even that will resist without injury the heat of large masses of combustibles in a building. They think, however, that the plan they suggest will give reasonable security to the archives. The plan strikes us as an excellent one for its purpose. It leaves untouched the question of securing the files of papers that have to be kept at hand because they are constantly wanted, which are therefore the most important, and for which provision will have to be made by improving the construction of the department buildings. But it would diminish greatly the disaster of fires in the present building, and the disaster of them when they did occur. It would also relieve the buildings of much unreasonable overcrowding, and the department clerks of much consequent inconvenience. The true policy is the careful subdivision of the records and their distribution in rooms that do not communicate, and are so small that a fire will not get dangerous headway in any of them.

WHEN the building of the new Museum of Fine Art was begun in Boston, three or four years ago, some gentlemen of that city, interested in the technical education of artists, formed a plan for establishing a school of drawing and painting in connection with the Museum. The act of incorporation had included education in the arts among the objects for which the Museum was established; and its Trustees lent a hand to the proposed school by providing suitable rooms for drawing in the basement of their building. While the building was going up, the plan of the school was maturing, money was raised by subscriptions to meet the cost of opening it and maintaining it for the first year, and a director selected; so that when in the summer of last year the Trustees, opening the Museum to the public, definitely put the rooms they had prepared at the disposal of the school, its organization was rapid. A permanent committee was appointed for its management, including four painters, three architects, and the three chief officers of the Museum. Three thousand dollars had been raised by subscription, which was afterwards increased to five thousand. Mr. Otto Grundmann, an artist of Antwerp, was engaged to take charge of the school; and was authorized to provide and bring with him the necessary casts, and other appliances for instruction. Dr. William Rimmer was engaged to direct the classes in anatomy. Eighty applicants having answered to the circulars that were sent out to invite students, the school was opened on the 2d of last January.

WE have just received the first annual report of the permanent committee, which gives a very encouraging account of the year's work. It was soon found that the number of students required another teacher in drawing. Both day and evening classes were formed, the number of students being respectively one hundred and two and forty-seven. It was intended that the school should be primarily one for professional instruction, and that whatever amateurs attended it should be required to do the same thorough work as was expected of those who aimed at becoming artists. The work was therefore laid out so as to require steady and serious effort, a minimum of three hours' attendance on five days of the week being required. It resulted, though no restrictions on entrance were fixed till it appeared that there would be more applicants than there was room for, that scarcely any pupils entered who were less than twenty years old, or who did not intend serious work; and the managers soon succeeded, they tell us, in establishing the habit of straightforward purpose-like application that distinguishes professional from amateur study. It is not surprising to learn that while the evening-classes were naturally all male, seventy-seven out of the hundred and two day-students were women. The laying-out of the course seems to have been very judicious. No classification of the scholars was attempted, nor any system of promotion by which the students were first trained exclusively in one kind of work and then passed on to another. The work of each student was changed from week to week so far as they were competent, he who was set to drawing from the life or painting one week being expected to draw from the cast the next week, for the sake of keeping him well exercised in all parts of his studies, and of averting a tendency to disdain or impatience of any part. The work included crayon-drawing from the flat (for the inexperienced), from casts of features, heads, and limbs, and from the figures and groups in the sculpture-gallery of the Museum, which were thrown open to the students, and from the life; painting from the living model, and from still life, for which again the resources of the Museum were very useful; and occasional copying of drawings of the old masters. At the end of the year some sixty of the day-students and all the evening-class applied for re-admission. On the whole, there seems reason for hearty congratulation of the authorities of the school on the success of its first year.

THE Washington *Star* makes an opportunity to advise the American Institute of Architects to mind its own business, and not to meddle with the Washington Monument. We think the Institute really did wisely in taking no action at all concerning the monument at its Convention. The proposition to interpose its advice came before it in a form likely, we think, to be met with distrust, to arouse unnecessary and perhaps irritated opposition in the body who have charge of the monument. It was a matter which required very delicate handling, and there was not time in a hurried session of the Convention to do it justice. The subject is far too serious to be complicated by personal feeling, if it can be helped. It was better then for the Institute to do nothing than to do any thing in such a way as to excite needless distrust and antagonism. There may be persons who without consideration would assume that the Institute had no concern in the matter; and that the Monument Association, or rather its officers, were the only persons whose views should be consulted, that it was their business and nobody's else. We cannot suppose, however, that these gentlemen themselves have any such idea. It is as thoroughly a public business as any political matter. The people of the country have given their money, and are asked again to give. The different States have made their official contributions; Congress itself has been appealed to, and has made an appropriation for it. The project is one in which every citizen ought to be interested, and to which he indirectly, if not directly, contributes. It is

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therefore the business of every citizen; and every citizen has the same right to offer, to maintain, and to urge an opinion, as on any public measure that comes before Congress. The officers of the Monument Association are the stewards of the public in this matter; they ought to desire — we assume that they do desire — to know the judgment and the wishes of the public. The general public has given little thought to the matter, and probably has formed no opinion on it; but those who have considered it and have spoken are, we believe, pretty unanimous in condemning the present project, not merely as insecure, but as altogether unsuitable in design.

ACCORDING to the last accounts, the Monument Commission appointed by Congress have considered the report of the engineers, from which we quoted in our last issue, to the effect that there had been an error in the observations of Lieut. Kingman, and therefore no such settlement as had been reported; and their suggestion that the foundation be strengthened, the earth on which it rests being confined in a sort of caisson, to prevent its yielding. The commission have decided that the Act of Congress under which they are appointed gives them no authority to spend money in improving the foundation of the monument, nor in continuing it against the advice of the engineers; and they have therefore decided to refer the matter again to Congress. The whole subject is likely to come up afresh; and though we are glad that the Institute's Convention decided to pass it over in silence, we hope that neither the Institute, nor any one who thinks that the thing ought not to go on in its present shape, has yet said the last word.

LATE numbers of the illustrated papers, have contained wood-cuts of the design by Mr. J. C. Markham, architect, for the monument on the battle-field at Saratoga. It is a tall octagonal obelisk, with Gothic gables applied to the four cardinal faces at the bottom, bringing the base to a square, and supported by short heavy angle-buttresses. Under each gable is a large pointed arched opening divided by a heavy transom. The obelisk is banded, and lighted at three levels by spire-lights in four faces. It is in fact a Gothic spire resting on a dwarfed belfry stage, and set upon the ground with no tower under it. Only the sharp point and the finial are lacking. The idea is novel, and is carried out with considerable vigor and independence. These qualities ought not to pass without commendation in these days when so many monuments are set up which show none of them. Nevertheless the idea seems altogether wrong. A tower is as appropriate a form of monument for a battle-field as can be devised: it may have a spire or not. But to build the spire without the tower looks as unreasonable and is as unsatisfactory as the habit of fifty years ago, which we are now apt to deride, of clapping the portico of a Grecian temple indifferently on a church, a bank, a dwelling, or an out-house; and is very much of a piece with it. The New York *World* says: "It stands to reason that a spire which is well adjusted to its function as the crowning member of a tower as tall or taller than itself must undergo such modifications in proportion and in detail, as will convert it into an entirely different thing, in order to make it look well when it rises directly from the ground. This spire is set upon the ground essentially unmodified. It is fair to say that failure in an attempt to design an adequate monument to commemorate the battle of Saratoga does not by any means put the designer below the average level of his profession. It only shows that he does not rise far enough above that level to be one of possibly half a dozen architects in the State who could be intrusted with such a work with a reasonable chance of even moderate success. We can appeal confidently to the judgment of educated architects to sustain us in saying that the execution of the published design will not do credit or justice to the State, and we trust it is not too late for the committee to revise its action and take steps towards securing a better."

A SECOND attempt of the master-masons in London to supply the place of their striking workmen has failed. The stampede of the Germans we have already chronicled. Some American workmen have also been imported; but they too were "got at," and have deserted. The long wars between masters and men, all over England, are doing serious injury; and now that a system of lock-outs on the part of the masters is fairly set up against the strikes of the men, we hear much talk of the need of a habit of settling disputes by arbitration. No doubt arbitration is a great deal better than strikes and lock-outs; and, pending the discovery of some still better way out of the difficulty, it may be welcomed as a relief by the community. It is, however, but a palliative, and not likely to touch the root of the difficulty. It practically is apt to be only a compromise which brings disputants to meet each other in a half-way accommodation, but which leaves the principles in dispute undecided. It is apt, that is, to be simply a way of dodging a difficulty by common consent, and leaving it as a seed of future trouble. If arbitration were to become common, there is too much reason to fear that this is the form it would usually take. The real trouble lies far below the reach of arbitration, in the rooted antagonism of the men and their masters, and their imagined conflict of interests. It is to the study and removal of this antagonism that those who are interested must soberly address themselves, if we are to avoid future confusion, and worse.

ARCHITECTS AND CLIENTS.

THE personal relation that exists between architect and client is close enough to give full effect to differences of opinion, and therefore many occasions for forbearance, many opportunities which a lack of it may easily turn into quarrels. It is easy, and usually superfluous, to argue the importance of forbearance. Clients, however, need sometimes to be reminded that the work of an architect is in a great degree tentative, at least until his relation with his client is long-established and familiar. To adjust a given number of rooms for given uses, and to enclose them with proper materials well put together, to fit them up with prescribed appliances, — these are problems which allow of a definite enough solution. In arranging for them an architect's work is as straightforward as a mechanic's; there is no more occasion for experiments, approximations, or failures. But it is a matter of time, often of a good many experiments, to find out a client's whole wants, still more to learn how to suit his taste. The more individual and decided the client is, the more important it will be to him that his architect shall thoroughly understand his ways, at the same time that it will be a more difficult and slower, a more tentative process, to adapt a piece of work to them satisfactorily. Clients are too apt to forget that in this respect an architect's work by no means ranges with the exact sciences. They forget, too, that the wants and likings which are familiar to them by nature or habit are not necessarily those of the rest of the world, and that those which are not so are probably just the ones which it will most annoy them to have disregarded. They fail, therefore, to explain these peculiarities with due minuteness, and are disappointed, perhaps offended, when they find that the work has gone on without allowance for them. The natural temptation then is to set down the omission as a neglect of the architect. Most architects can remember a client coming to them at some time or other with a complaint something like this: "I find that my blinds have been made without rolling slats; I supposed of course that the blinds would have rolling slats." Or it may be: "Why are there no soapstone dampers in the fire-places? I never thought of having a fire-place without a soapstone damper." The architect may have answered: "You will remember that we had great difficulty in getting the cost of the house you wanted down to the limit you prescribed; in fact, we were obliged to overrun it somewhat, and you insisted on economizing wherever it was practicable. I felt obliged therefore to confine myself to what is usually considered necessary, and did not think of adding the small luxuries which increase the estimates, except where you especially required them." — "Yes," answers the client, "but I want to be comfortable; and soapstone dampers — or rolling slats — are things that I am very particular about. I never dreamed of your leaving them out."

It often happens that a client who tries to be considerate finds that his work does not go just as he would like to have it; that his architect, from failing to quite understand the client's likings, or perhaps from a little natural professional obstinacy to which the other yields here and there to avoid conflict, has done one thing after another in a way that does not quite suit till they accumulate into a serious disappointment, or what at first looks like it. This is perhaps

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most likely to occur with the better class of clients and the better class of architects: that is to say, with clients who, while they have distinct preferences of their own, wish to be as considerate as possible of the convictions of their architects, and to avoid unnecessary clashing; and with architects who have strong convictions, especially where the artistic part of their work is touched, where they naturally consider themselves more instructed than their clients. Such architects are liable, in all conscientiousness, to push those convictions to the actual dissatisfaction of their clients; forgetting that they owe conformity to the ultimate wishes of the client in all cases but the extreme ones which justify them in withdrawing from his service altogether. Dissatisfaction which comes up in this way will often grow on one side till the accumulation of little disappointments seems beyond endurance; while on the other it is not so much as suspected. The client gradually comes to think that his architect is discourteously neglectful of the preferences which he has only half displayed; and when the explosion comes that is pretty sure to come at last, the surprised architect is bitterly aggrieved at the accumulation of concealed displeasure, which might, he thinks, have been avoided by a little seasonable frankness, — displeasure which the client has repressed with an idea of courteous forbearance, but which, to the architect, may seem to have been disingenuously concealed.

Misunderstandings of this kind, which are by no means uncommon, suggest one of the reasons why many men of decided notions prefer to employ builders to work for them, under their own direction, rather than commit themselves to architects. The mechanic has no convictions, unless in regard to the mechanical mysteries of his trade, where his employer cannot follow them; and, not finding them in his way, is content to leave them uncrossed. The employer, knowing that the mechanic expects to be directed, does not hesitate to watch him and follow him up with a minuteness of direction which he would not expect an architect to take in good part. He ends by securing at least the particular things on which his mind is set; and if he fails of a good many additional conveniences and elegances which the skilful adjustment of an architect would give him, he does not know it, and so does not miss them. It is the legitimate claim of an architect, that his skill enables him not only to contribute his own ideas of comfort and beauty, but to satisfy the special wants of his client, to carry out his wishes, and even whims, if need be, more successfully than another; provided he is made fully acquainted with these wants and wishes. His claim is pretty generally acknowledged nowadays, where his profession is well established; but there still are, here and there, a good many intelligent persons, who know pretty well what they want, and are just the men whom it would be to his advantage to serve, who instinctively turn rather to the builder, whom they know they can direct. It is common to lay this preference to the unpractical ways of the architect; but we suspect the real root of it is more commonly a fear of his intractability. This intractability, again, too often means simply neglect to inform himself minutely of his client's wants, — wants which the client on his part too often assumes to be general instead of peculiar to himself, and for which, though he would explain them carefully to a mechanic, he assumes that an architect would make provision without being told, if he were what an architect should be.

All these things point to the need of a thoroughly confidential relation, within the limits of his work, between an architect and his client; a relation which is not like an ordinary business negotiation, but is rather, as we have before urged, like that of a legal adviser, or family physician. Such a relation is not usually established in a moment, nor can it be always established at will between any two persons taken at random. It is therefore worth while for clients to make deliberate choice of an architect, as they do of a counsellor in law or medicine, and not be in too much haste to take advantage of professional competition. The architect once chosen, it is to the client's advantage to use the utmost freedom of consultation, and to take care that his work is not made less satisfactory by hurrying it, nor by taking for granted things that might be explained. When confidence is established he will not, if he is wise, be in haste to change his architect; but will see that one who knows his ways can continue to serve him, other things being equal, better than a new one. It is true that a man is not likely to build as many houses as he has law-questions or illnesses; but if he has once had occasion to employ an architect, it is found that he is very apt to do so again. When a confidential relation has been established, it is much better economy to continue it than to go in search of a new one. To a profession the formation of a permanent *clientèle* is always an element of stability. It tends to diminish the evils of indiscriminate competition, and gives a hold on public confidence. It gives the practitioner opportunity to study his work to the best advantage, and an assurance of reasonable remuneration, while it saves a great amount of work which may be wasted in abortive projects. Public work will naturally remain the subject of competition, but private work need not. Clients will do better in the long run to adhere to a satisfactory connection once formed, than to be diverted from it by the fascination of this or that beauty which they may admire in a neighbor's building. In this, as in other matters of professional dealing, it belongs to the architect to point the way. It is in the end profitable as well as honorable for him to show a delicate consideration to the business connections of his fellows; to address himself to a very careful study of the wants and preferences of his own clients; and especially to beware of the temptation to look upon their work as mere opportunity to carry out pet notions of his own.

THE COLORING OF WALLS.

THE men to whom we intrust our house-painting — men who have mixed colors all their lives after a fashion — do not seem to have an idea of what constitutes a hue or a shade. The mechanical dexterity displayed in their work is equal to the average in other callings; and one would think that however deficient the painter's knowledge of harmonious combinations may be when he begins to work his way up as an apprentice, he would learn to appreciate what is really good coloring, when brought in contact with it. But in this we are mistaken. Test it, if you will, by giving him a room to re-paint, — one that was originally tinted in several shades, but which, having become soiled and worn, we wish to renew. He will take your order, and the mechanical part of his work will be good; but his shades and tints will all be stronger and deeper than in the original, giving one the impression that he had resorted solely to the primaries to produce the desired effect, instead of keeping to the combinations that were once the charm of the room. The attempt to reproduce the delicate corn-color will result in a near approach to chrome yellow; and the French gray, — well, we may call it violet or light purple, for it will bear no other interpretation; while the general effect will be one of contrasts, so crude as to disturb the eye and leave upon the mind any thing but an agreeable impression. Time so employed is thrown away, — worse than that, for what is done will put us back instead of helping us on in our efforts to improve.

A woman of the Turkoman tribe, — the most ignorant of the nomads, — through the exercise of her natural taste, will weave a carpet marked by a finer combination of color than could be designed by the cleverest pupil in our art schools. Her colors will be strong, but they will not be harsh or confused in their combinations, for she knows how to balance them; and herein lies her superiority. A color that is pure and positive need not be tawdry. There is nothing vulgar in the employment of a bright knot of ribbon, neither is there any thing loud or startling in the use of polychrome; but the bright bow may be resorted to when it would be wholly out of place, and polychrome may be introduced where it would be positively ugly. It does not follow that the defect in either case may be traced to the color, but it rather comes from the mode of applying it. Nor do we escape the dilemma by resorting to tertiaries and other low tones; for even with these a discordant note may be struck, and our sense of fitness be disturbed. If one cannot swim, paddling in shallow water is but a miserable counterfeit of the noble art; and he who fears to load his palette with the primaries will make but sorry work of it when he seeks with tertiaries alone to decorate his walls.

How often have we been told that colors must be perfectly balanced and properly relieved; that masses of bright colors may be so arranged as to produce an effect the very opposite of repose; and that dark colors, unrelieved and unbalanced, will weigh us down by their heaviness! We know all this, — those of us who have given any thought to the subject, — but what is wanted is, that the many should give heed to these things — should learn to discriminate between good and bad coloring. No one ever found fault with a Persian rug for being tawdry; no one ever saw one that could come under that head; and one is yet to be seen that is not glowing with color. The splendor of the Byzantine churches has never been surpassed; their mosaics are unrivalled; and their gorgeous coloring on a gold ground is the realization of the beautiful in decorative art. St. Sophia at Constantinople, St. Mark's at Venice, and the Capella Reale at Palermo, are aglow with light and rainbow tints; yet all are in keeping and subservient to the lines of the architecture.

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But what would be in keeping in some great cathedral would be wholly out of place in a smaller structure set apart for daily use. In painting and decorating a house we can only use the primaries sparingly; for if we load our walls, which are to form the background, with strong colors, what resource shall we have when we come to the selection of furniture and carpets? This is the rock on which not a few founder; and many, in trying to avoid it, run to the other extreme, — that of pale, faded, sickly, washed-out colors, void of expression, and meaningless. There must be something bright in every room, if we only know how to get it there, either on the walls or in the furniture; some decided effect, aided, strengthened, and enriched by contrasting colors, to give it life and character. We cannot confine ourselves to half a scale, and have perfect harmony. If we resort to blue, scarlet, and purple, we find there is something wanting, and not until orange is added are we satisfied. If to the blue we add brown and crimson, we must have gold or yellow to help them out. The crimson and brown together are dull, the blue does not relieve them; but when the gold is added, the effect is wholly different. And so of hundreds of other combinations. Purple and white are cold, purple and black are heavy; but purple and gold form a perfect harmony.

As I have already stated, there are hundreds of pleasing combinations that will produce a charming effect. But to those who have given the subject no attention, this is a problem hard to solve. Unaided they seldom arrive at pleasing results; and, unless one is sure of his footing, it would be better for him to take professional advice, than to run the risk of almost certain failure.

CHAMPLIN.

THE ILLUSTRATIONS.

TOWER OF THE CHÂTEAU DE GOURLAINE, NEAR NANTES, FRANCE.

THE sketch of this interesting fifteenth-century tower is taken from the *Croquis d'Architecture* of the *Intime Club.*

SKETCH FOR THE PUBLIC LIBRARY AT EASTON, MASS. MESSRS. GAMBRILL AND RICHARDSON, ARCHITECTS.

(*Gelatine Print.*)

STORE-FRONT ON ESSEX STREET, BOSTON, MASS, MESSRS. CLARKE AND DEWSON, ARCHITECTS.

CHINA PAINTING.

DURING the last few years household art and interior decoration have become as common as household words in England, and, since the Centennial exhibition, in this country. Of their various manifestations, there is no one that has been more interesting to watch in its developing than the "china craze," which has become so common throughout this country, that in many classes of society there seems to be a mania for possessing and collecting, not so much the old china, Henri Deux, old Sèvres, old Dresden, Urbino ware, Delft, Rouen, Worcester, and Lowestoft, as the more easily obtained wares of the modern English and French potteries, Doulton, Minton, Stief, Caen, Haviland, Deck of Paris. To eke out the collection, and possibly to add by contrast to the factitious art value of these works of foreign artists, there will usually be found more or less of the work of American amateurs, generally weak in intention, and crude in execution; but occasionally giving promise of good results after careful instruction, or after the teachings of individual experiment and failure.

As a natural outgrowth of this state of things, there has been a growing demand for books of instruction and treatises on the art of painting on china. This demand publishers have met in various ways; some by publishing reprints of English or translations of French and German treatises, and others by publishing compilations by non-professionals who, not writing from their own knowledge, have made mistakes which mislead the beginner, and warn the professional china-painter to mistrust the whole work. We believe the only original treatise by an American author has lately been published in Cincinnati.[1]

Like all the treatises referred to above, this little treatise of some seventy pages by Miss McLaughlin is intended only for the instruction of amateurs; and though it tells nothing that cannot be found in other works of a like character, it contains fewer errors, is less liable to mislead than many of its foregoers, is clear and concise in its directions, and contains all that is absolutely necessary for the mere beginner.

Among the things to which we take exception is the advice given to submit each article to but one firing. This may be excused by the manner in which it is at present possible to fire china in Cincinnati; but unless the simplest colors are used, and those too which fuse at the same temperature, two firings and often three are a necessity, if the decorator wishes to see his or her work gain its full finish and effect. Moreover, when gold is used it must always be applied after the first firing, and fused by a light fire. Again, if some of the directions for mixing colors were implicitly followed, the paint would be found too oily to stand the fire, and in other cases trouble would arise in putting in large flat washes from the color drying too rapidly.

As this little work professes to be merely for beginners, and not for professionals, it should be criticised only for what it professes to be, and we have found it good. We cannot help wishing that it had been a work for professional china-painters. Treatises for beginners flood the market. M. Edouard Rischgitz, for years at the head of Minton's factory, has published a little book which gives excellent directions to beginners in over-glaze painting. Mr. Sparkes of the South Kensington Museum has written a careful, easily understood pamphlet on both over and under glaze painting; also intended for beginners. These two books are at present the best, almost all the others containing the same directions, clumsily given, and confusedly arranged. What is now needed is a comprehensive work on china-painting, which shall treat the subject exhaustively; which shall go into the chemistry of the materials; shall tell the effect of fire on colors, glazes, and pastes: in short, a work which shall give concise and simple rules for the guidance of the professional artist, who, already knowing the mechanical part of his work, needs a handbook which shall save him from tedious and expensive experiment. The work which most nearly meets this want is a French work published in the early part of this century, and known, if we mistake not, as the *Manuel de la Peinture sur Porcelaine, par M. Roret.*

[1] China-painting: a Practical Manual for the use of Amateurs in the Decoration of Hard Porcelain, by M. Louise McLaughlin. Cincinnati: Robert Clarke & Co., publishers, 1877. Price 75 cents.

CORRESPONDENCE.

HARTFORD, CONN., Oct. 23, 1877.

ASIDE from the lesson which this State has recently been taught of the faithlessness of public servants in a prison, the late developments open up the question of prison architecture in Connecticut. The institution at Wethersfield, a few miles below this city, was originally built in 1823, at a time when four walls, properly grated at doors and windows, were thought sufficient to detain convicts within their cells. It was a common brown stone structure 154 feet long by 43 feet wide, and 30 feet high, having four tiers of cells. In the rear were heavy brick walls, built out from the prison with a connecting wall parallel to the building, and within the space enclosed were the work-shops for the inmates of the institution. Developments of the times not only increase whatever is good and worthy, but they also devise new methods of crime, and sharpen the wits of criminals. Curious as it may at first seem, art has to keep pace with crime; and prison architecture has made rapid strides of progress within the last fifty years. This fact would have been illustrated here some time ago, had the prison commissioners carried out the plans for a State prison, which were carefully prepared by the late firm of Bryant and Rogers. There seemed, however, to have been a tendency on the part of the State to conduct affairs on the penny-wise-and-pound-foolish principle; and instead of ordering a thorough remodelling of the structure, which in some respects was beneath criticism, regarding quarters for convicts, consciences were set at rest by the raising up of the main building one story, the erection of a warden's house, and a small addition or two at other points; in fact, a "tinkering up" of the prison in place of a complete overhauling, and the building of a State prison in accordance with the advanced theories respecting the construction of this class of work. Had some of the thousands spent upon the new Capitol been devoted to this object, the State would have been the gainer, not the loser. The plans referred to comprehended a central guard-room, with cell-wings radiating therefrom, thus concentrating the important work of overseeing and guarding; the principle being the same as that set forth in the new Massachusetts State Prison, and other kindred institutions throughout the country.

The past season has witnessed the erection of several private residences which attract more than passing attention, and add not a little to the architecture of Hartford, which has been on the advance of late. Conspicuous among the new works referred to, is a wooden cottage for the Rev J. S. Davenport, just completed from plans by F. H. Kimball. The cottage embodies many new features, and presents the results of study and thought in design; and while some of its novelties are in marked contrast to the average style of house-building in Hartford, they are decidedly refreshing to the artistic eye, and illustrate the possibilities of material if correctly and judiciously handled.

The house occupies a lot in the fashionable district of the city known as the "Hill." Its front is varied by the projections of two wings, which stand out from the main line, and are harmoniously treated, one with a gable of timber-work, the other with a hip roof whose lines are broken by the introduction of a finely designed double dormer window. The windows at the sides of the house are made effective by their grouping, and the introduction of the invaluable bay windows is productive of good effects both externally and internally. The cottage is clap-boarded to the height of one story, the upper portion being ceiled. The single windows are capped by hoods; and in some instances shingles are used for ornamental purposes, notably beneath the principal gable of the main wing. The approach to the house is by means of an ample porch, simple but effective in design. The posts as well as the hand-rails are worked from the solid, and the former are relieved

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of their plainness by V-lines. The piazza, which extends along the front of one wing, exhibits timber-work of the boldest description, the posts, rails, and corbels showing great solidity of construction. The cottage has steep roofs which are covered with dark slate; the ridges are crowned by a cock's-comb cresting of galvanized iron colored to represent tile. This piece of ornamentation is infinitely preferable to the ordinary iron cresting. The chimneys are laid up with red mortar, beaded brick being used at the angles. The window-sash are variously cut up for the reception of small glass, the prevailing pattern showing border-lights some two inches wide with central ones of good proportions. Externally the house has been painted a warm red, which relies upon the softening influences of time to tone it down into a desirable shade. Relief to the monotony of the color has been given by the use of black paint upon the chamfered edges of the window-casings, upon some of the members of the moulded string-courses, and elsewhere throughout the building.

The characteristic feature of the interior is the hall. It is entered by means of double oak doors whose upper panels have leaded lights of stained glass. A quadruple mullioned window with swinging sash lights the hall; and beneath are comfortable window-seats. The hall is sixteen feet square, finished in butternut, with floor of oak, and the staircase is of ash; the customary use of balusters being varied by the introduction of upright square posts with fan-shaped corbels at the intersection of the hand-rail.

The mantel and fireplace are wholly of red brick, except the shelf, which is of Ohio stone, with moulded edge. The fireplace has a pointed arch, and is ornamented by tiles. The parlor, library, and dining-room are finished in butternut, with the exception of the mantels, which are of ash, from designs by the architect, including some finely selected tiles of symbolic patterns. The rooms on the upper floor of the house have a finish of pine. The building is about 50 feet by 40, besides one wing running back 42 feet, being a part of the original house to which the additions have been made. The contract, which did not include the plumbing or the heating, was about $6,000, and is considered marvellously low in this city. The cottage is one of the most picturesque pieces of domestic architecture in Hartford.

A recent number of the *American Architect and Building News* contained a communication from the western country, extolling the virtues of the brick produced there. Here, in the little State of Connecticut, to show that something besides the proverbial nutmeg is manufactured within its borders, a trumpet might be blown in a modest way over the success attending the making of moulded brick by a Hartford firm. It is not supposed that they will rival in extent the works of some London firms whose specimens are occasionally seen in this country; but like those establishments the Hartford manufacturers have issued an illustrated circular, showing the patterns which they produce, and announcing that architects' special designs can be executed to order. In fact, the experiment is but the working-out of suggestions made by local architects; and the resultant good of the introduction of ornamental brick-work here may be traced back to the profession. From this source many good patterns were obtained, not only shapely in themselves, but designed for practical use in particular instances. But on the principle of the old proverb, the best test of the project is the demand in the market for the stock manufactued. The newer brick buildings erected in the city during the past season illustrate the use of ornamental brick in a variety of ways, and calls are being made for them in neighboring cities. There are in stock a dozen or more different patterns of these moulded brick, besides patterns for diaper-work; those designed for use in cornices, in string-courses, window-jambs, etc., embrace the "bull-nose," the "nail-head," the "ovolo," the "corner-bead," and many others as effective; perhaps the most successful patterns are those for belt-courses about a building, where excellent combinations can be produced. The enterprise of the manufacturers is to be commended; and after the brick are once thoroughly established in public favor, their use will doubtless be universal. They certainly are to be preferred for ornamental work to black brick, so popular in many cities; and without producing the striking and almost funereal effect of the latter, assert their importance in another way, abundantly making up what they may lack in color, by pleasing contour and relieving projection. With this valuable addition to the variety of material used in building, it is not impossible to produce in brick structures, comparatively speaking, a maximum of effect with a minimum of cost.

A flutter of expectation is occasionally caused among the members of the architectural fraternity in the city, by the announcement that a certain church organization is discussing the erection of an edifice, or is negotiating for an eligible site. An item to this effect appeared in print recently, stating that the Universalist Church was contemplating the purchase of some real estate owned by Trinity College, in the centre of the city; but it proved to be premature. The church which was formerly owned by the society stood upon what is now the busiest street in Hartford, and sixteen years ago it was purchased by an Episcopalian parish and removed, each stone being marked and set up in place again, about a mile from its original site; some few texts upon raised shields, which were a sort of moral eye-sore, were cut away; but with this exception, the edifice appeared the same as it left the hands of its builders. Recently some alterations have been made in the building, by means of which it now has a recessed chancel, and a comfortable vestry-room. It is known as Trinity Church, and was built from the designs of Le Fevre of New York. It is a Gothic building, and has some remarkably good details.

A house now building for Mr. T. S. Steele, in the western part of the city, was begun early last season. It occupies a corner lot, and is treated with reference to the commanding position. The house is of wood, set on costly and massive foundations of Portland stone, showing rock-face. An angle-tower is carried up at the intersection of the principal façades, and on two stories its walls are pierced by triple windows with mullioned lights; the tower is terminated by a high pointed roof. The lines of the front are broken by a projection, which is carried up and finished by a gable, displaying what might be termed "fancy" wood-work, to borrow a phrase from the builders' vocabulary. Upon the southern side of the house is a spacious *porte-cochère*, showing constructional timber-work, supported by brown-stone underpinning. This elevation shows considerable variety in the design; and the lines of the roof are broken by many dormer-windows, as well as by the roof of a large bay carried to the full height of the main buildings. The roofs are slated, and their ridges are treated to a bountiful supply of low iron railing; while the extremities of the dormers, and likewise those of the tower, and the turret upon the principal roof, bristle with iron finials of elaborate workmanship. The house exhibits much detail work, a good proportion of which is seen about the windows; but owing to its delicacy of execution it fails in the effectiveness which might have been gained by a more spirited treatment. The work has been done by contract; and for its better accomplishment a shop was built on the site by the parties interested, who are from Providence, R.I.; the various works being executed by out-of-town men. The interior of the house is conveniently planned. It will cost some $30,000.

CHETWOOD.

PLASTER CASTS.

NOT long ago the Prussian Ministry of Commerce and Manufactures offered prizes for the best and most simple methods of so treating ordinary plaster of Paris casts, by chemical or other means, as to render them capable of being washed, and at the same time to close the porous surface of the plaster, that dust might not penetrate its mass.

Plaster casts, even after having been thoroughly treated with stearin, are soluble in water to a very considerable degree. One need but tint the water with bluing, or some similar color, and the gradual softening and solution of the plaster can be readily followed by the eye. A more striking illustration is had by stirring together a thick cream of plaster with gelatine previously treated with chromic acid, and letting them harden. When soaked a while in water the plaster wholly disappears, is dissolved away, and leaves a sponge-like substance of the insoluble gelatine. From these experiments it is seen that plaster casts, though saturated with stearin, should never be washed.

A method hitherto much used is to paint the plaster with oil-color; but, apart from changing the appearance, the paint fills up the cavities, and, especially when the cast is a relief, blurs and destroys all its delicacy and exactness. On architectural plaster ornaments for interior decoration, capitals, cornices, etc., painting may be tolerated; but on all reproductions of sculpture, even a single coat of paint is inadmissible. Dr. Reissig of Darmstadt has by two different processes succeeded in transforming plaster of Paris into chemical combinations entirely insoluble, not only in water, but in warm soap-suds. The first method, simplest and cheapest, is based on the fact that sulphate of lime (plaster of Paris) is changed by baryta-water into sulphate of baryta, and a caustic lime gradually transformed by the action of the air into carbonate of lime, as we know from the similar action in plaster and mortar. Baryta-water is prepared by slacking together in a securely corked bottle, one part crystallized hydrate of baryta, with about twenty parts rain-water, thus forming a saturated solution. After it has cleared, it is sponged or is poured over the plaster as long as this continues to absorb it. If after the cast has been dried by a moderate heat, the plaster continues to accept the wash, the sponging may be repeated; but this is seldom the case. This treatment, besides hardening the cast, gives it a whiter and clearer appearance.

The second method consists in changing the sulphate of lime, by the use of a weak alkaline silicate of potash, into silicate of lime, an exceedingly hard and durable substance. To obtain the potash silicate, water containing about ten per cent of caustic potash (pure and free from iron) should be heated to the boiling point, when so much silicic acid is added as will dissolve itself therein. In cooling, pipe-clay and silicate of potash are generally precipitated in some degree. The liquid should be preserved in corked bottles until entirely clarified. Immediately before its use a small piece of pure potash should be thrown into it; or in its place, one to two per cent of potash solution may be added. The silicification itself is effected by dipping the plaster for a moment into the bath thus prepared; or, if the cast is immovable, by applying it with a sponge or an atomizer. When the surfaces to be covered

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are large, the liquid may be diluted with rain-water. After the almost instantaneous chemical change has taken place, the superfluous solution should be carefully removed by washing with soap-suds. Some little experience is necessary to decide the exact time of exposure to the solution in this second method; but by practice it may soon be judged by the smoother and firmer appearance of the plaster, and by its hardness as felt by the finger-nail. The fresher the plaster, and the more porous the cast, the more quickly should the bath be employed. Casts made of old plaster cannot be silicified to advantage. After having been treated by either of these processes, plaster of Paris casts will not be in the least dissolved by washing with water or soap-suds; but, though their surfaces are no longer sulphate of lime, yet they still retain their original porous nature, and readily absorb dust and the dirty water of the first washing. To obviate this, they are finally coated with an alcoholic solution of common soap, which, after the evaporation of the alcohol, entirely stops up the pores, and much facilitates the washing. It may be prepared by dissolving one part of bar or castile soap in ten or twelve parts of alcohol; or it may be had of apothecaries under the name *spiritus saponatus*. This latter, however, is generally prepared with alcohol of a low grade. A little more expensive, but much better filling, is to be had by dissolving steatite of sodium in pure spirits of wine; this gives a really beautiful transparent tone to the plaster, and is highly to be recommended. The application of both is the same, it being necessary, if possible, to warm the cast, that the solution may be well absorbed; a repetition of the process is desirable.

With the evaporation of the alcohol the operation is completed; the cast is in effect vitrified without coating its surface.

J. T. C.

ST. THOMAS'S CHANCEL.

MR. JOHN LA FARGE has made a picture of the chancel at St. Thomas's Church, as he made a picture of the whole interior of Trinity Church, Boston. It is perhaps quite as well that he was restricted to the chancel here; decoration of the entire church would have been an extremely difficult task — a task which admitted of hardly more than the rather unsatisfactory accomplishment of obliterating and softening bad effects. And as it is, his picture is framed and focused, as it were, by the commonness and cheapness which surround it on all sides and terminate instantly when they touch it. Standing at the entrance of the nave in the sickly, lemon-hued light which there distresses one, the golden mellowness that floods the chancel is defined and emphasized as it could hardly be under other circumstances, unless, indeed, the interior architecture of the church were less complicated, confused, and pretentious, so that its entire decoration might be a unity. Enough trouble was experienced by Mr. La Farge in his treatment of the chancel only. The apse of the church is polygonal, and has five sides; it is stone to the roof, plastered within and ceiled with wood. Twenty feet from the floor perhaps are five windows, with three lancets each, and above these are traced with wooden strips apparent relieving arches, from whose points also wooden strips imitate ribs of stone vaulting and meet overhead. The point of meeting — of course there is no key-stone — is considerably above the point of the arch which separates the chancel from the nave, so that it and much of the chancel ceiling is hidden from the view of any one not within the rail. The chancel being deep and the different panels few and wide, the two extreme panels make a large surface that is either invisible or foreshortened to the observer at the farther end of the nave. The light is very high and confused; it comes in from the semicircle — let us say — of windows, and is opposed by a higher still row of gas-jets, which follows the line of the arch that bounds the chancel and is invisible to the congregation. The windows are of stained glass, now painted over, but the linear design has been necessarily preserved, of course. These are some, at least, of the mechanical difficulties with which it is apparent that Mr. La Farge has had to contend. It is well to bear them in mind in judging of the decoration. It is also well to understand that the work cannot be regarded in the same light that it could be if Mr. La Farge had simply received a commission to decorate this chancel without stipulation concerning expense.

But whatever this decoration might have been if Mr. La Farge had had none of the disadvantages that we have mentioned to contend with, and by study and patience, and hard work on his own part, and on the part of his assistants, to endeavor to overcome, — what it is already, and much more what it promises to be, is very certain. It promises to be in all respects the best piece of church decoration in America, outside of Boston; and in some respects, and in so far as it goes, better than even Mr. La Farge's similar work in Boston — more elaborate at once, and more delicate in certain regards. We say what it promises to be, because the work is not complete; its scheme includes two large paintings, one of which is unfinished, and the other not in position. The latter will be put up to-morrow, and is to occupy the two panels on the right of the chancel. It is a canvas, about twenty feet long by fifteen feet high; on the left is the tomb, "hewn out of solid rock," near which two soldiers have fallen asleep, and on which the angel is seated; on the right, the Magdalen is kneeling at the feet of Jesus, as he says, with a gently repellant gesture, "Touch me not." We can speak of it better after it has taken its place as an element of the entire decoration. The left-hand picture, which will not be ready for some time, we believe, is also a subject of the resurrection, and is to be of the three Marys to whom the two disciples are telling their strange tidings.

The centre panel is the main point of the lower decoration that visitors to the church to-day will note. The episcopal chair and the gold cross which were always here still remain. But the latter has been set into a panel of plaster upon which are sculptured in high relief kneeling angels and cherubs. On either side of the cross kneel six angels in pairs, one above another, each pair occupying a panel in the sculpture itself; two others kneel at the foot, each with a cherub below and in the corner of the work. Above is a crown; and beneath it and where the sculpture melts into the wall, hover cherubs not regularly and formally distributed, but disposed in a way which tends to give freedom and movement to the whole. On either side is a pilaster of gold and dark color, carved and inlaid with mother-of-pearl. The crown, the kneeling angels, and the floating cherubs, are painted a delicate blue and gold. Looking long at this whole piece of relief, one grows fond of it. The general design is Mr. La Farge's, of course, and is extremely poetical. Whether it is intended to symbolize any specific sentiment, we do not know. It does not need to, certainly, and may rest on itself quite confidently. Devout persons who desire symbolism that is too shadowy to seem superstitious to them may take the suggestion of the rector, Dr. Morgan, that it typifies the enwrapt contemplation of the mystery of the Cross, too high for even the angels to comprehend; "which things the angels desire to look into," if a text is needed. But in any event these angels are very lovely, very nice; unless "nice" seem in any way a depreciatory epithet. They were modelled in Paris by Mr. Aug. St. Gaudens, of this city, than whom we have no sculptor of more delicate feeling, or more refined sense of movement and grace; and they were painted by Mr. Low, whose "Reverie" observers of the best pictures in the last Academy exhibition here ought to recollect. The painting disappoints us a little. It is somewhat pale and gray, probably because Mr. Low, who is certainly a vigorous enough painter, felt the delicacy of Mr. St. Gaudens' work, and knew of the subtlety of Mr. La Farge's. Unless it assists the paintings when they are put up by acting as a kind of foil of coolness to their rich color, we may venture to hope that Mr. La Farge may accentuate it here and there. And the horizontal lines in relief must be acknowledged to give an effect of formality and rigidity — as if the angels were occupying each pair a pigeon-hole — that the rest of the design is entirely without. However, it should be borne in mind that no part of the decoration that we have hitherto spoken of is to be considered complete.

The upper decoration — we have left any word of the mouldings and pilasters till we can speak of the paintings which they will frame — consists of the five windows and their surroundings of mullions, nook-shafts, and corbelled columns; which surroundings are a deep red in harmony with the general color of the church and the ceiling. The windows are three-light traceried windows and of stained glass, painted over by Mr. La Farge and his assistant Mr. Smith, an artist whose inexperience is very measurably atoned for by his cleverness and his feeling. The linear design is, of course, preserved, as we say, and so is not to be laid at Mr. La Farge's door. In color too, he was necessarily hampered. In many instances he had no large choice, being able merely to neutralize tints that he found, and display his own art in delicacy of handling and in details. But what he has accomplished one may readily see by glancing at the rest of the stained glass in the church. This, although it may not have seemed atrocious in color heretofore, must seem atrocious now by contrast to all but the color-blind. To take such glass as Mr. La Farge found, and to make it really noble, deep, rich, mellow, beyond any thing of the kind on this side of the water, displays an ability in art which one can characterize only by saying that it is artistic ability of the very highest order.

One forgets how much of the art of painting on glass has been lost, and can easily imagine himself before some antique window in looking at the left lancets in the centre window and the one next it to the south. If we were to select beauties in this glittering emblazonry of jewels, we should take these two. The one in the centre is of the figure of St. Thomas, we presume. But it matters very little who it is. Was ever richer deep blue-green than the robe? Was ever more delicate shining opaline tint than the face and hands? And, if this seems an exaggeration of enthusiasm to the congregation of St. Thomas's, was ever lovelier mystery than that of the landscape in the next window? Is not stained glass an admirable material to show how far art is separated from literal imitation? Fancy binding a tree into a sky with color so that all sense of where the leaves end and the sky begins is lost, and the eye delighted as only the illusion of art can delight it. Try to count the different greens in these leaves; try to discover what is beneath and beyond them; try to express in words the meaning of this mysterious meaninglessness. And observe what an effect is lent to all these windows by the tenderly glowing deep topaz that the red and gold ceiling is, — and reciprocated by them. This ceiling, with its amazing soft reflections of color thrown back and forth by the inclinations of the vaulting between the blue and white ribs, is in itself a noble decorative

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picture; and if the rather formal regularity of its deep blue arabesques and their not too graceful lines are detractions, they are slight enough to make one half hesitate to mention them. Mr. La Farge's picture is a unit as it stands; it is safe to say that it will not lose in unity by the hanging of his paintings. — *New York World.*

THE QUALIFICATION OF ARCHITECTS.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — Your suggestions and comments in a recent number of the journal, regarding the adoption of some measures whereby the public may be protected from malpractice by those professing to be architects, who in reality are not sufficiently competent, are suggestions of vital importance, not only to the public concerning life and property, but also concerning the welfare of the profession itself. But there are difficulties attending the problem of the selection of the fittest, and the exclusion of the unfit, when measured by the standard of a purely theoretical schooling alone, which would be lessened, in our opinion, if said schooling was more universally coupled with the experience of the "workshop," such as is obtained in institutes of technology, wherein theory and practice go hand in hand. The institute, however, cannot even under the best advantage extend its practical facilities to a degree equal to the every-day experience of the established architect of unquestioned ability, or of the workshop of the builder of large experience and practice. Therefore it appears to the writer, that the natural and practical way of forming conditions wherein the abilities of whoever claims to be an architect can be properly, and to the public acceptably, judged, is, for those architects who are established with reputations beyond all doubt as to their safety and efficiency, to establish a bar or barrier which shall admit or recommend to professional practice only those whom its appointed judge shall deem fully competent. The process of selection by the public would thereafter be confined to those whom it might reasonably be sure were to be trusted, at least as far as safety is concerned. It may be anticipated by some, that this would tend towards centralization of power, by which those established, and so disposed, could limit the number of practitioners, and therefore naturally enough admit but few in any city. But a second thought will convince such that this element does not really exist; for when it is understood that it requires years of study and application to be *reasonably* admissible to practice, and also years of patient waiting and working to become *established* after beginning practice on individual responsibility, then it may be assumed that the law of supply and demand will as naturally regulate this matter as the matter of merchandise.

ARCHITECT.

THE EFFECTS OF LIGHTNING.

IT is estimated that at least 45 persons are killed annually by lightning in this country. The average number of deaths by lightning has been: 22 in England, 9 in Switzerland, 3 in Belgium, and 75 in France. In France alone, during a period of 30 years, over 10,000 persons were smitten, of whom 2,252 were instantly killed. Eighty were wounded and 9 killed during one thunder-storm at Châteauneuf les Montiers in 1861; and within one week, when the air was highly charged with electricity, thirty-three fearful flashes of lightning were observed, each bringing death to some victims.

During the sixteen years between 1799 and 1816, 156 vessels of the British navy were struck by lightning, 73 men were killed and 138 injured, and the loss of materials amounted to over a million of dollars; but since the system of metallic conductors adapted for vessels, devised by Sir W. Snow Harris, has been applied to the vessels in that navy, the losses and damages by lightning have almost entirely ceased, although the number of vessels has been greatly increased.

On the night of April, 1718, twenty-four steeples were struck along the coast of Brittany; and, on the 11th of January, 1815, twelve steeples suffered a similar fate in the Rhenish provinces. On the 27th of July, 1759, lightning burnt all the woodwork of the great cathedral at Strasbourg; and on the 14th of August, 1833, it was struck three times within a quarter of an hour, and so much damaged that the repairs cost about $6,000,000. In 1835 lightning conductors were placed upon the building and steeple, and since then it has not been damaged whatever by lightning, although discharges have on several occasions occurred in line with the top of the steeple, which is 437 feet above the ground. On the 18th of August, 1769, the Tower of St. Nazaire, at Brescia, was struck, and the subterranean powder magazine, containing 2,076,000 lbs. of powder belonging to the Republic of Venice, was exploded. One-sixth of the whole town was laid in ruins and the rest very much injured, and about 3,000 persons killed.

On the 26th of June, 1807, the powder magazine of Luxembourg, containing 28,000 pounds, was struck, and besides about 80 persons killed and 200 injured, the town was ruined. Explosions and large fires, involving a great loss, have become rather frequent in this country, owing to the iron tanks used for the storage of petroleum being struck by lightning. From March to August, in 1876, over 10,000,000 gallons, and on April 19, 1877, over 2,000,000 gallons of oil, and the village of Troutman, were destroyed in the oil regions of Pennsylvania.

During Aug. 14, 15, and 16, 1872, portions of New York State and the New England States were visited by some of the most terrific thunder-storms ever experienced, during which over 200 dwellings were struck and damaged, about 10 persons were instantly killed, and 160 stunned. One of these storms occurred at midnight, at Arlington, Mass., Aug. 14., in which brilliant streams of electricity darted across the sky in every direction, and the thunder which followed was constant for a period of thirteen minutes, without the intermission of an instant of silence. Three hundred and thirty-one discharges were counted in seven minutes by an observer; and each discharge was followed by loud and sometimes rattling reports, whose reverberations rolled through the heavens in an endless procession of majestic and terrific sounds.

In the States of Illinois and Iowa, and the prairie country west of the Mississippi River, thunder-storms are generally more terrific, and more lives have been lost there from the effects of lightning than in any other section of this country. Owing to the said country being level and devoid of trees, the equilibrium between the electricity of the atmosphere and that of the earth is principally restored by disruptive discharges. — *Spang's "Treatise on Lightning Protection."*

THE METRIC SYSTEM.

AT the meeting of the Boston Society of Civil Engineers, last week, it was voted to send the following memorial to Congress: —

To the Honorable the Senate and the House of Representatives of the United States, in Congress assembled, —

The memorial of the Boston Society of Civil Engineers respectfully showeth: That the incongruous weights and measures which have been in general use by this nation since its birth are inconvenient in computation, ambiguously named, and irregular in their ratios one to another; whereas the metric system which was legalized in the United States in 1866, and has been adopted by nearly all the governments of Europe and America, has decimal subdivision like the federal coinage, a uniform nomenclature, and very simple relations between its several units.

That the following-named seventeen organizations have assured your memorialist of their co-operation in petitioning your honorable body to make the metric standards, after some date, to be fixed several years in advance,— viz., Boston Society of Medical Science; Boston Society for Medical Observation; the Belles Lettres Society of the Illinois Wesleyan University, Bloomington, Ill.; St. Joseph's Medical Association, St. Joseph, Mo.; St. Louis Medico-Chirurgical Society; New England Association of Gas Engineers; Boston Homœopathic Medical Society; Engineers' Club of St. Louis; San Francisco Microscopical Society; Middlesex Mechanics' Association, Lowell, Mass.; St. Louis Medical Society; Alameda County Medical Association, Oakland, Cal.; Chamber of Commerce, Richmond, Va.; Mt. St. Mary's Seminary of the West, Cincinnati, O.; New Haven Medical Association; Massachusetts Medical Society.

That the following resolution was proposed in the forty-fourth Congress, as appears from the Congressional Record for May 8, 1876, but was never voted upon: —

"*Resolved*, That the heads of the executive departments of the government be, and they are hereby, requested to report to this house, at as early a date as practicable, what objections, if any, there are to making obligatory in all governmental transactions the metrical system of weights and measures, whose use has been authorized in the United States by act of Congress, and also how long a preliminary notice should be given before such obligatory use can be introduced without detriment to the public service; and that they are also requested to state what objections there are, if any, to making the metrical system obligatory in all transactions between individuals, and what is the earliest date that can be set for the obligatory use of the metrical system throughout the United States."

Your memorialist therefore prays for the adoption by your honorable body of the said proposed resolution.

NEW PUBLICATIONS RECEIVED.

THE METRIC SYSTEM of Weights and Measures. By J. Pickering Putnam, architect. Boston: American Metric Bureau, 1877.

CABLE MAKING for Suspension Bridges. By Wilhelm Hildebrand, C.E. New York: D. Van Nostrand, 1877.

REPORT of the International Conference on Education, held at Philadelphia, July 17 and 18, in connection with the International Exhibition of 1876.

THE FRENCH EXHIBITION OF 1878. — The Paris Universal Exhibition Building for the exhibition of 1878 is being pushed rapidly to completion by the French Government, and already has a grand appearance. The Great Hall is completed up to the springing of the iron roof trusses, and more than three-quarters of the iron and glass roofing over the industrial galleries on the Champ de Mars has been completed. In the centre of the building is a wide open air avenue, in which will be placed the fine-art galleries. It was at first thought that there would be no necessity for annexes; but the idea has been given up, and the Champ de Mars will be more crowded with supplementary buildings than it was in 1867. Half of the space of the Grand Vestibule will be used for the exhibition of the presents received by the Prince of Wales during his visit to India.

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NOTES AND CLIPPINGS.

THE DARIEN CANAL. — Lieut. Wyse, leader of the French expedition to examine the isthmus, has returned, and reported results. He favors the scheme of cutting a direct canal in a straight line, south of the Panama Railway, from the Chucunaque, north-east to Port Gande, which he asserts can easily be done, the ground being completely level, and presenting only relatively narrow masses of earth to be removed, should it be decided to form a tunnel. He thinks that an inter-oceanic canal, and that by way of Colombia, will soon and easily be made, and calculates that the cost will not exceed 3,000,000 per kilomètre, which is 0.6214 of an American mile. The French survey at the close of 1876 was made with the permission, and even the co-operation, of the government of Colombia; and because the central government of Bogota had granted in 1867 certain privileges of canalization to the Panama Railway Company as far as the line which joins Cape Tiburon to Garachine Bay, it was only to the south of this line that new explorations could be made, under an authorization granted to the French association in May, 1876, by the government of Colombia. Viscount de Lesseps, who constructed the Suez Canal, is understood to be the advising engineer of the French Darien Canal Association.

LONGEST TUNNEL IN AMERICA. — Few people know how great an engineering enterprise is going on in Baltimore County. For one thing alone, a tunnel six and four-fifths miles long, 30,510 feet, is being built underground, for over four-fifths of the distance through hard gneiss and granite. It will be the longest tunnel in the country, and there will be only two larger in the world, — Mont Cenis, which is eight miles in length, and the St. Gothard now in process of construction, which is to be nine and a quarter miles. The fact that the water supply tunnel lies near enough to the surface to allow of numerous shafts, greatly facilitates its construction. The tunnel is a circle twelve feet in diameter, and extends from the Gunpowder River, about eight miles from the city, to Lake Montebello, the distributing reservoir near the Harford turnpike, about one mile and a half from the city, the direction being twenty degrees west of south. This tunnel will conduct the water from the Gunpowder River to Lake Montebello. Thence a conduit 4,120 feet long, known as the Clifton tunnel, from the fact that it passes under a portion of Clifton Park, conducts the water to a point just south of the Harford road, where it enters six mains, each four feet in diameter, which convey the water to the city, a distance of 1,900 feet. The country along the line of the works is hilly, and the tunnel varies in depth below the surface from 67 to 353 feet. There are fifteen shafts in the main tunnel, the deepest extending 294 feet below the surface. The water rains down from the crevices of the rocks, and pours along the bottom of the drift. The work of the tunnelling is all done by hand, it being cheaper than the machine-work in a drift of such narrow diameter. — *Real Estate Reporter.*

WATER WORKS. — The Columbus, Ohio, water-works, which are upon the Holly system, have now been in operation about seven years. Since they were built, the city has abandoned the use of their entire force of steam fire-engines, and the losses by fire have been decreased from an average, previous to the introduction of the water supply, of 65-100 of one per cent to 9-100 of one per cent upon the total tax valuation, while since 1870 the valuation of taxable property has increased, in round numbers, from $16,000,000 to $27,000,000 in 1876. The average daily amount of water now being pumped is about 1,600,000 gallons; the machinery with which the works are supplied being capable of furnishing 10,000,000 gallons daily for domestic use, or 7,000,000 gallons under fire pressure. There are now in use in the city upwards of 600 improved water-meters, from the Eagle Meter Co., of Brooklyn, L.I., which are recommended by the engineer in his report as giving better satisfaction than any meter yet tested. Since their introduction, three years ago, the consumption has but slightly increased, notwithstanding the growth of the city. There are about 45 miles of cast-iron pipe laid, in connection with the works, which was furnished by H. R. Smith & Co., of Columbus; to the credit of which establishment it may be said that not a single length has thus far been obliged to be taken up from any faultiness of the pipe. — *Engineering News.*

SIEMEN'S ELECTRIC LIGHT. — By experiments with Siemen's electric light in New York lately, an illumination was produced so intense that the eye was dazzled in looking at it across the East River. The electricity is produced by a powerful battery, worked by steam, and which makes seven hundred revolutions a minute. It is conducted to the lamps by two wires, having on each end a carbon point. When these are joined, there results a dazzling white light. The heat generated by the electricity was sufficient to melt a piece of glass in about six seconds.

THE PARIS OPERA-HOUSE. — The façade of the Paris Opera-House is to be illuminated during the evening by electric light thrown upon it by the Denagrouse process.

ELECTRIC LIGHT. — The city of Exeter, Eng., has delayed completing the purchase of gas-works in the hope that before long it may be able, thanks to the progress now making in the electric science, to light the city by electric light.

THE MEYERBEER PRIZE. — Ephraim Keyser, a sculptor of Baltimore, has been awarded the Meyerbeer prize at Berlin. This prize was instituted by a brother of the composer, and is given each year alternately to the best painter and sculptor of the Jewish race throughout the world.

MR. ADAM SCOTT pithily says that "a water-closet may be considered a kind of life-annuity to the nearest plumber."

AN IRON CONCERT HALL. — A novel building is just built at Carnarvon, North Wales, for the purpose of supplying Carnarvon with a suitable public hall, large enough to accommodate at least 6,000 persons. The pavilion is the largest public hall in the principality, being 200 feet long and 100 feet wide. It is built in three spans or bays, 34 feet high to square, and 54 feet high to the apex of the ventilator. The main roof is carried by wrought iron principals; rafters of T-iron, and ties, strut-rods, and braces of round iron. The principals are supported by cast-iron columns, having ornamental caps, and cantilever brackets, springing from the square part of the column. The lean-to roofs are supported by timber rafters, struts, and tie-beams resting upon brackets cast on columns to receive the same, and upon the side framing, which is of timber, as in the gable end framing. The roof, sides, and ends throughout are boarded, stained, and varnished; and on the boarding is laid a layer of non-conducting, inodorous felt, to prevent the possibility of draught and to render the acoustic properties of the building more complete. Galleries extend along almost the whole length of each side, supported by timber beams, bearers, and struts; wide pitch-pine staircases leading to and from the galleries to the level of the floor, and the galleries being protected along the front, by an elaborate ogee section railing of suitable design in cast iron. The exterior of the pavilion is entirely covered with galvanized corrugated iron. The lighting of the building is arranged by means of segment and other lights at each end of the hall; at the sides by continuous lights along the main and lean-to eaves, and by circular-headed French casements; the latter of which are all made to open for ventilation, and a continuous ventilator also runs along the entire length of the main roof.

CHURCH IN PHILADELPHIA. — The new Reformed Episcopal Church at Chestnut and Aspen Streets has a front of 85 feet on Chestnut Street, and a depth of 140 feet on Aspen Street. The main front is of light gray Ohio sandstone, and the sides of pressed brick, with stone dressings. The building has two entrances on Chestnut Street, and one on Aspen. The audience-room is 68 feet wide, exclusive of a recess at the pulpit, and 95 feet in length, with recesses at each end of 16 feet additional, and 50 feet in height. The roof is in one span, with no supports to obstruct the view from any point The interior is ornamented by coupled Ionic pilasters; and the ceiling is coved up to a height of ten feet, the remainder being flat and ornamented with projecting ribs. The pedestals under these pilasters are of Marezzo marble, which is used to form the wall-lining of the pulpit recess. The pulpit is on the longest side of the building, and around it the pews are arranged in concentric circles, sloping up gradually as they recede from it. Opposite the pulpit, and extending around three sides of the room, is the gallery, at its lowest point twelve feet above the floor below, its shape coinciding with the curvature of the pews. The interior woodwork is of walnut and ash, the walls being wainscoted with black walnut panelling. The principal feature of the main front is the tower, which is 25 feet square at the base, and is carried up 120 feet, with a belfry stage at the top entirely of stone. The main entrance vestibule has supporting columns of stone 2½ feet in diameter, coupled on either side of the doorway. The seating capacity of the building is about 1,000.

SUPERHEATED STEAM. — Bradley's Promether consists of a generator which is a tremendously strong iron box about three feet square (for 35 horse-power), in which are arranged a series of bulbs somewhat like those in Harrison's safety boiler, but put together more strongly and with special care to make tight joints. A pump throws the water, which is disintegrated into the form of an extremely fine mist like the spray of perfume thrown from the bottle by being forced through a small hole by squeezing a rubber bulb. The bulbs in the generator at the time the spray is thrown are heated to a dull red heat. At a test the generator marked a pressure up to 4,000 pounds per square inch; and even at this, so perfect was every joint that there was no leakage. The great end that is claimed to be accomplished by this invention is economy in fuel, and the adaptability of the new motor to any existing form of the engine. Its saving in fuel is claimed to arise from the immense pressure which can be distributed by cutting off the motor from the cylinder at an early part of the stroke. Thus, if an engine had a cylinder of 20-inch stroke, working at 100 pounds pressure, and cutting off at one-half stroke, by using the motor at 500 pounds pressure, it can be cut off at one-tenth of the stroke, and at the same time, owing to the increased initial velocity, show greater indicated horse power."

SURFACE DRAINAGE. — A Philadelphia newspaper (the *Press*) thus finds fault with Philadelphia drainage: — "It is strange that while in England, in all the towns, large and small, the refuse waters of houses are carried off under ground, in this city surface drainage should be so obstinately adhered to. It is condemned by sanitary authorities as prejudicial to the public health, if not in the same degree as open sewers, yet to some extent as much so. The street-gutters are badly constructed. Few of them, except in heavy rains, have any flow; and in hot weather, the stagnated pools that form in them throw off very offensive odors. Open sewers are breeders of disease, and street-gutters are also recognized malarious agents. That so beautiful a city as Philadelphia should be defiled with filthy drainage flowing on the surface of its streets, surprised the visitors to the Centennial Exhibition, and the more so, as in Boston, Washington, and most of the Western cities, subterranean drainage to the common sewers is now adopted. The superior purity of the atmosphere and the greater cleanliness of the streets in the newer portions of the city, where surface-drainage is done away with, must strike every one. The reform should be made universal throughout."

THEATRE. — A new theatre was opened at Cork, Ireland, Sept. 17. The building was designed by Mr. Phipps, F.S.A. The depth of the theatre from the curtain to back of pit is 69 feet; the stage is 48 feet deep, and the proscenium is 30 feet wide.

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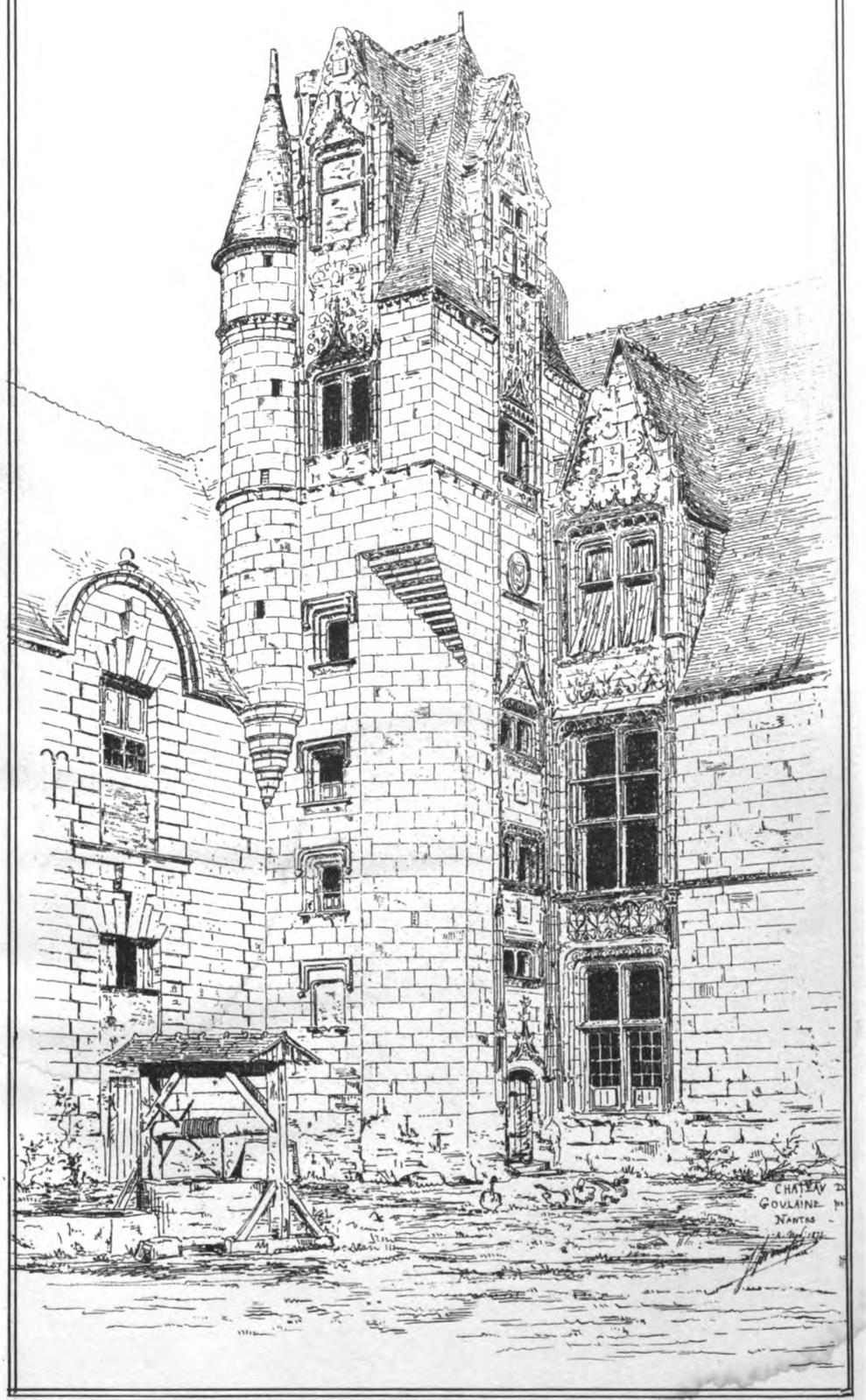

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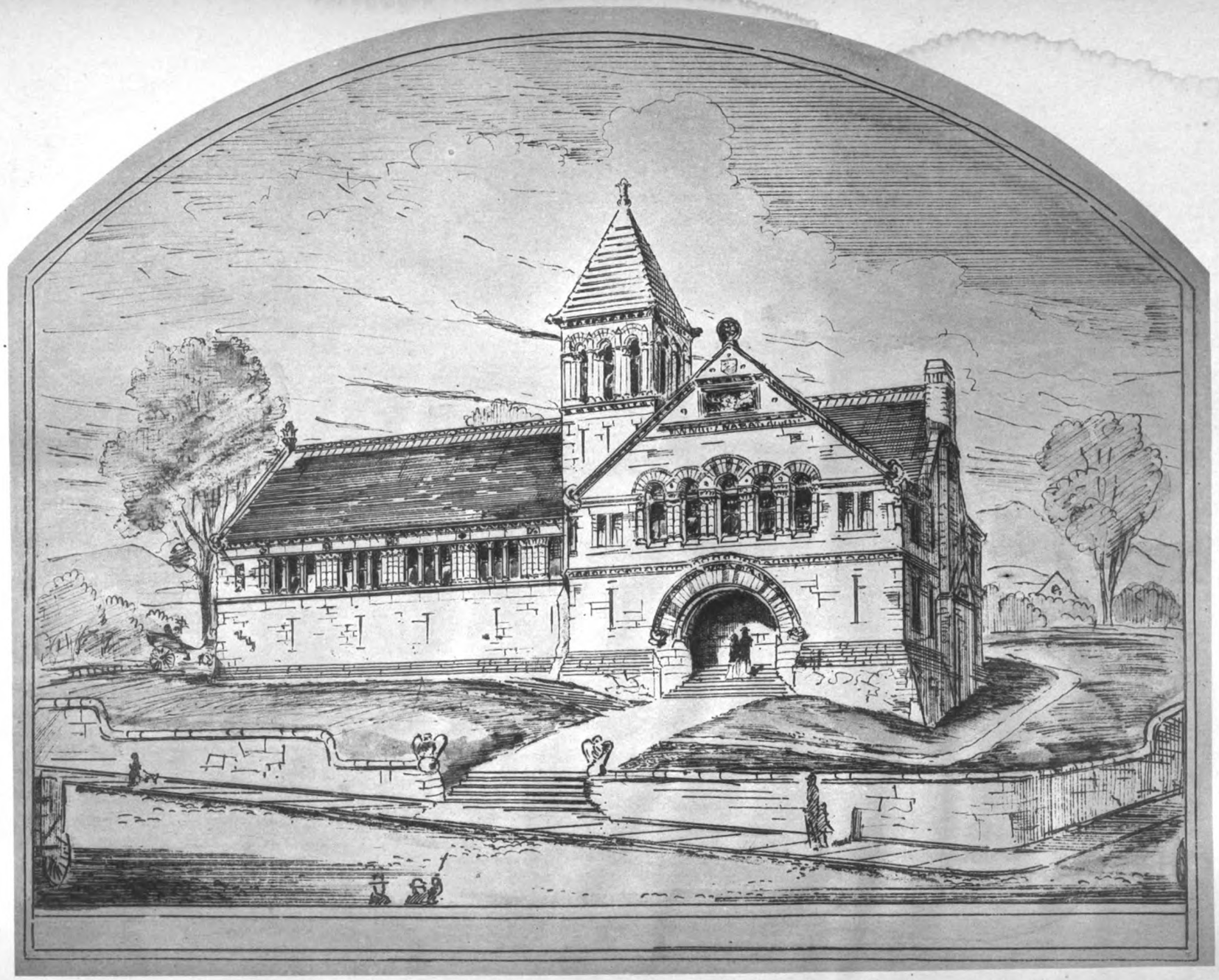

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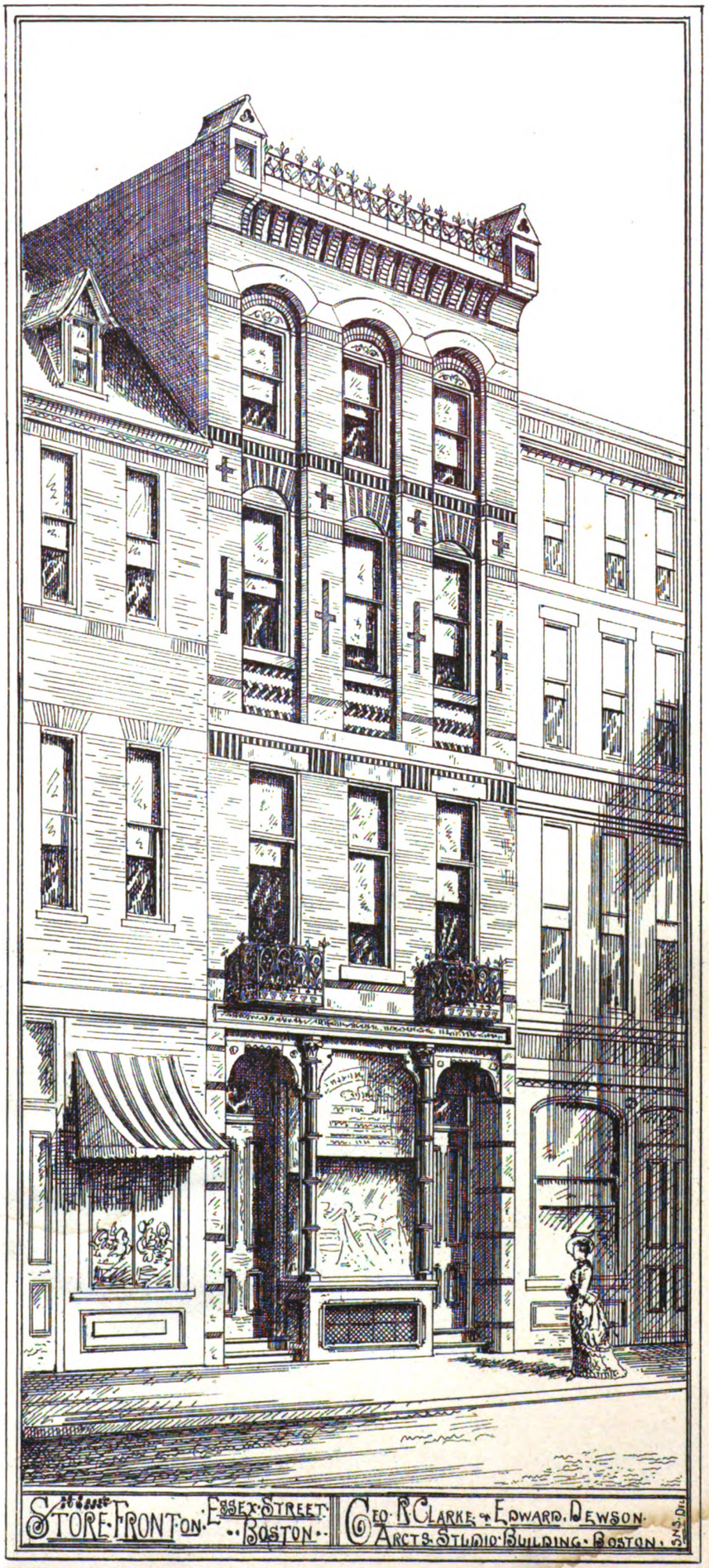

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, NOVEMBER 10, 1877.

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THE Congress of the Protestant Episcopal Church, which has just met in New York, brought out a number of papers on church architecture, from which some interesting extracts will be found in the letter of our New York correspondent in another column. This was one of the subjects taken up just before at the Convention of the American Institute of Architects; and it is to be regretted that the discussion of it which would have followed the papers read there should have been choked off by the press of executive business. The question, What shall be done with modern churches? is one of the most interesting that architects have nowadays to consider; and in the United States, at least, where the prestige of the traditional forms is less regarded than in Europe, the study of it is as likely to be fruitful in new developments as any part of their work. The different requirements of liturgical and non-liturgical churches point to differences of type; and architects are somewhat slowly coming to conform themselves to these requirements. The better architects, it must be confessed, being better acquainted with the traditional types, and more sensitive to their beauty, have been on the whole rather slower in conforming than their less instructed fellows, who were trammelled with little knowledge of the past, and who have so done the most of what has been done in developing certain new forms of churches which are really becoming characteristic of our country. The tendency which has told most on the forms adopted for church-buildings has been to regard them as intended more for preaching and social purposes than for worship. This leads to the planning of many groups of buildings, or buildings containing groups of rooms, assigned to various uses, and to the application in certain quarters of the term "auditorium" to the room in which the congregations assemble for preaching and worship. As yet only a few persons, of those who have discussed the subject publicly,—Mr. Cummings at the Convention of the Institute, and Mr. Hunt at the Church Congress, for instance,—have considered the adaptation of the form of the church proper first of all to hearing and seeing the minister; that is, of bringing the congregation together compactly into an unencumbered space about the chancel or pulpit; yet this is usually the first problem which a church committee nowadays lays before its architect. If the wants of the congregational churches of the day are faithfully and ably studied, they bid fair to lead to the development of as interesting and novel forms of architecture as any of our time, however little they may conform to what some persons would consider religious architecture.

SAN FRANCISCO has been contributing her share to the labor troubles that vex Europe and the United States. She has her own special element of difficulty in the prevalence of Chinese labor; an element which keeps her working population in a pretty steady ferment, and gives pretext to her idle population for disorders that every now and then break out into threats of violence, and even such acts as the recent attempts among the "hoodlums" to burn the Chinese quarter. For some time back there has been a series of open-air meetings, called working-men's meetings, in which the most communistic and aggressive movements against the public peace have been urged with increasing energy, until it has come to actual threats of mob dominion, and of personal violence against individual men. The authorities, after letting the meetings go on undisturbed through dread of provoking the lawless classes unnecessarily, have stopped them and arrested a number of the leaders. For the present we have no further account of disturbance; but it is too much to expect that in a city so full of dangerous elements, permanent tranquillity is to be so quickly secured. At present poor John Chinaman serves as a buffer between the disorderly and the better classes; but when he is put out of the way, whether by removing or by crushing him, the law-abiding people will be left to front the full violence of the proletariat, which is in San Francisco exceptionally dangerous. The most perilous fact in these present demonstrations, as in the the late railroad riots, and in other popular disorders of the day, is that the working-man is used as a cover for them, and tricked by the leaders of a mob into lending himself to them. Unless the well-meaning men who do the bidding of trades unions and demagogues can be helped to see that they are playing into the hands of the vilest class in the community, they will yet make themselves responsible in San Francisco and elsewhere for terrible disaster.

THERE seems to be little doubt, at the time we write, that some provision will be made by Congress for the representation of the United States at the Paris Exhibition next year. Possibly by the time this reaches our readers, the proposition of the House Committee on Foreign Affairs touching the matter will have been presented. The interest of the administration in it has been generally known. It is said that Secretary Evarts favors the appointment of several commissioners of equal rank in order to distinguish various gentlemen who were conspicuous by their labors in behalf of the Centennial. When one considers how easy it is for men who are joint representatives of their country in a foreign undertaking to disagree, and impede their work thereby, one is tempted to think that the efficiency of a commission that will have a good deal of hard work to do, and not a great deal of time to do it in, might be best secured by putting a single very capable man at the head of it,—and when we remember what our country has suffered of commissioners in times past, we will add, a creditable man. It is to be hoped that when the matter is laid before Congress by the committee, it will not be allowed to hang fire, in spite of the ten or twelve hundred bills that have been presented before it. The time that remains for preparation is not long, and it is desirable that the men who wish to exhibit should know as quickly as possible what they have to depend upon. Already there seem to be a number of volunteer commissioners in the field, under the name of Exhibition Agents, Representatives of Exhibitors, and the like, whose occupation would be not of very great importance, we should suppose, if a government commission were appointed, and probably useless if it were not. It is not yet clear what appropriation will be asked from Congress. Secretary Evarts's estimate is unequally reported at $225,000, and $140,000, and it is said the committee will ask for $150,000. The Chicago *Inter-Ocean* reports the following estimate: One commissioner-general, $8,000; ten commissioners, $1,000 each; the general expenses of the commission in Paris, $10,000, and the same for freight, transhipment, etc., abroad; $20,000 for freight and shipment in this country, with $8,000 more for preparatory work here; and $9,000 for contingent expenses; but this makes only half the sum proposed. A ship-of-war is expected to be detailed to carry the exhibits across.

WE find in the *Architect* the memorandum prepared by the Royal Institute's committee on the Paris Exhibition, for use of architects who wish to exhibit. The committee has decided "to aim at forming a select collection of works of genu

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ine excellence, rather than a large one including works of moderate or inferior character, in the belief that such a collection will most adequately represent our art as practised in this country at the present day, and will be worthy of the position which English architecture may justly claim before Europe." Drawings are invited from all architects of Great Britain and Ireland. The committee announce with careful emphasis that there will *not* be a public exhibition of the offered drawings, but that they will select from them those which are to be sent to Paris. The drawings are to be in narrow frames, with narrow margins, and there are to be no plans except key-plans included in the same frames with the drawings they illustrate. The rule at first laid down by the French authorities excluded all drawings of work executed more than ten years ago; but at the request of the Prince of Wales, who is president of the English Commission, it was modified so as to allow the entrance of work more than ten years old, but placing it "*hors concours;*" that is, not in competition for honors. There has been some talk about collecting drawings of the work of American architects for exhibition at Paris: if it is to be done, it is time that some decisive step toward it should be taken; but the matter is a difficult one. It would not be hard to get together shoals of drawings; but to form, like our English brothers, "a select collection of genuine excellence," is not so easy when there is no fully accepted central authority to make the selection. For the American Institute to offer to do this work, would be, to say the least, a delicate matter. Nevertheless selection is imperative. It is desirable that American architecture should be represented at Paris; but it is more desirable that it should not be badly represented. It will be represented badly however, if at all, unless the drawings that are offered are thoroughly winnowed. It is important therefore, if we are to make any exhibit of architecture, that the United States commissioners, when we have them, should have the assistance, through official appointment or otherwise, of the men best qualified in architecture.

THE lamentable death of Mr. Raphael Brandon, of which late English papers have informed us, takes away another of the English architects who have given good service to their profession by their literary work. He was a pronounced Gothicist, and with his brother, Mr. J. Arthur Brandon, who died several years ago, was the author of three works which are very well known to English and American architects, the Analysis of Gothick Architecture, Open-timbered Roofs of the Middle Ages, and Parish Churches. The first of these at least became an extremely popular pattern-book for architects and draughtsmen. Mr. Brandon was less successful in his practice than in his literary work. He built, however, some prominent buildings, notably two or three churches in London. They are mostly marked by the strict reverence for ecclesiastical precedent in which the first supporters of the new Gothic school walked, and which was the natural outcome of his assiduous study. He was one of the twelve architects selected by the British Government a dozen years ago to submit designs in the famous competition for the new Law Courts. We have heard it suggested, however, that this was done more as a recognition of his standing as a scholarly architect than with a belief that he was the man to carry on successfully so important a work. The design he offered shows his rigid ecclesiastical tendency very clearly, the chief mass in the group of buildings, which contained the great central hall, being to all intents and purposes within and without the simple reproduction of a thirteenth-century cathedral.

WE are sorry to be reminded by a letter from MM. Ducher & Cie., of Paris, the publishers of M. Garnier's splendid monograph on his new Opera House, that neither on the plate which we borrowed from that work for our number of Sept. 15, nor in the letterpress which described it, did we remember to give their house the credit of the publication. We had done so in our first notice of the work (Dec. 2, 1876), but for the sake of those readers who may have seen the later number and not the earlier, we hasten to make amends here. The value of the many architectural publications of MM. Ducher & Cie. is probably too well known to most of our readers to need our indorsement; but we regret our oversight none the less. Our much-valued fellow-journal, *La Semaine des Constructeurs* also, in a very courteous notice of our paper, reminds us with kindness that we borrowed its article and illustration touching the new *Hôtel de Ville* at Paris, without waiting for its authority. While the usages of American papers allow of great freedom in borrowing from each other, provided due credit is given, we much prefer, in dealing with our foreign contemporaries, to consult the etiquette to which they are accustomed; and we offer our apology for transgressing it. We are sure, nevertheless, as regards what we have done, that *La Semaine des Constructeurs*, when it considers that two months must pass between its issue of a number and our receipt of authority to borrow from it, and remembers the proverbial haste and impatience of Americans, will look indulgently on our share of the national weakness.

APROPOS of the *Nouvel Opera* we read in a late number of *L'Art Français* this lively comment:—

Of all the reproaches brought by criticism against the famous architect, that of the abuse of gold seems to have touched him most deeply. He comes back to it again and again, as to a spot which he can never sufficiently obliterate. Thus to those who have found the façade of the Opera House too much begilt, he replies triumphantly, that the gold of this façade did not cost eight hundred francs. Since it is not a question of price, but simply an artistic one, the reply to M. Garnier is obviously: Then, Sir Architect, this merely proves that you got a good deal of gold for your eight hundred francs. But M. Garnier cannot bear to have this gilding made a matter of reproach; and in spite of all his wit, which is certainly very keen and of the best alloy, he thinks he has found an unanswerable argument when he exclaims, "Ah! you have supposed that all this gold was gold. Well then, the vile and precious metal has only entered into my decoration as an accessory. In general there is only a varnish, a sort of pinchbeck applied to architecture." — So be it, but then there is too much pinchbeck.

ARCHITECT AND CLIENT.

II. — CHANGING ARCHITECTS.

WE came back last week to the relation between a client and his architect; arguing the importance to the best interests of the client, not only of full confidence on his part, but of forbearing continuance in their relation. There will be times, however, when the client thinks he finds, or really does find, that he cannot get the service he wants from the architect he has employed; and this not merely from malpractice, conspicuous neglect, or incompetence on the part of the architect, but from what we may class comprehensively as incompatibility. In cases of malpractice, or where neglect or incompetence is conspicuous, the client's remedy is clear; he has only to dismiss his architect, paying what charges the conditions of the case make him legally liable for, and choose another. We leave aside the question of incompatibility of temper; for mere quarrels are a subject on which we do not care to discourse. But when cases occur, as they will occur sometimes, where after sufficient trial it appears that, apart from blame to either side, the client does not get what he wants, and that if he is to get it at all, he must get it from another architect, what is to be done? Of the legal right of a client in such a case — or in fact in any case — to change his architect as often as he chooses, there can be no dispute. The point at which this right may be reasonably availed of, is to be determined in each case by the same common sense and exercise of courtesy that rule in other affairs of life. Here is, nevertheless, a condition of things in which, though particular cases cannot be provided for beforehand, well-considered principles of professional etiquette may be of service in smoothing the way for both client and practitioner.

There are clients who think that they may try on architects as they try hats, not expecting to pay for any but the one they like best. We need not waste time in showing the unreasonableness of this notion. It unfortunately is not without encouragement in the attitude of some of what the *Architect* calls the ragged fringe of the profession; but the decisions of the courts are a sufficient corrective of it. There are architects, on the other hand, who regard a client, once secured, as a kind of exclusive property, with no right even to redeem himself from possession till his work is finished, So far as concerns any attempt of other architects to get at a client who is negotiating with one, this is well, and ought to be zealously maintained; but as regards the freedom of the

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client it is most unreasonable, and would put him altogether at the mercy of the practitioner. A professional connection is not a trap, nor is it for the advantage of any profession to try to make it so. Any general attempts at this would be sure to end in something worse than failure. Fortunately for architects it is more troublesome and more costly to employ two of them than one, and therefore there is always one argument to which their clients are accessible and which they can turn in their own favor. It is not very often, nor likely to be, that a client, once fairly embarked with an architect, tries to change him in the middle of his course. That he has a right to, however, and that it is reasonable at times to exercise this right even apart from actual incompetence or malpractice, the profession ought frankly to admit, allowing that there are cases where it is best for the client, though he may have no special fault to charge against the architect he is employing, to call in the services of another, and for the architect to acquiesce in the change. The points of etiquette involved are delicate ones and difficult to discuss adequately; but it is worth while to consider some of the conditions which ought to be maintained. It is a question of conciliating a proper dignity and security of office on the part of the architect, with the best service of the client, that is, in the long run, of the public; and it is not to be forgotten that the best service of the public means the real welfare of the profession; that in fact the welfare of public and profession cannot be studied apart: that is best for each which is best for both.

In the first place, then, a change ought to be at the risk of the client: that is, he must not expect to get the services of two architects and pay only one, unless he has some fault to charge against the other that will stand a legal trial. Where mere personal dissatisfaction is the reason of separation, whether sufficient reason or not, it must be assumed in general that the fault is as likely to be on one side as on the other; and in all professions it is the established rule that service rendered must be paid for, except under the alternative sometimes offered by quacks, — no cure, no pay. The principle which we discussed some months ago, that the professional fee is proportioned to the importance of the service rendered to the client, is from its nature only to be applied by general average. The importance is to be estimated not by the value the client may set on the service himself, but by the average value of such services as usually rendered; otherwise we fall away at once from the principle of payment by a general scheme, and drift back into all the embarrassment of particular adjustment. It is assumed that in every duly established profession the well-qualified practitioner is capable of doing fair justice to the problem that is brought before him; and the average fee is based on this understanding. There is in the practice of them all an element of uncertainty, which cannot be eliminated. This is, in law the decisions of the courts, in medicine the practicability of cure, in the pastoral relation and in architecture the satisfaction of the taste of the parish or the client. Of this uncertainty it is always understood that the client, not the practitioner, takes the risk. If it were the other way it would probably be found that in those professions where the satisfaction of the client is the uncertain element, the risk would be vastly increased; and in all, the usual fees would have to be raised to cover the risk. By such a change the aleatory element, which is the bane of any profession, would be greatly aggravated, and with it an unwholesome competition, bitterness, and strife.

With this condition goes naturally the corollary, that the client must take the risk of selecting a suitable professional adviser; and must not be released from payment of his fees when service has been rendered, because he fails in this. The client's personal peculiarities enter too largely into this suitability to make it fair to the profession to throw the risk upon them. His protection against the oppressiveness of it is in being able to relieve himself of the responsibility when he can make it clear that his adviser's unsuitability is incompetence. Here is the point where architects owe to their clients, what for other reasons they owe to themselves, — some outward means of distinguishing those who have been duly qualified for practice from those who have not. If the dignity and standing of the profession require the establishment of the presumption that an architect in practice is fairly competent for the work that is ordinarily set before architects — and without this presumption we do not see how the architect is to claim payment for his work until his client declares it satisfactory, — the profession ought to be a distinctly marked and duly qualified body of men, who can show a fair warrant for their qualification; so that even if the client cannot easily decide who is a skilful architect and who an unskilful one, he shall not be without the means of knowing who has subjected himself to a proper training and who has not.

The duties of architects in the question we have been discussing are matter for another paper. It is certain that many of them are willing to make the way unnecessarily hard and the footing slippery for each other. We will only venture to remind them here that clients will not be ready to allow them more than they allow to each other; that permanent relations with their clients and secure remuneration are not to be encouraged by hustling each other in a struggle for patronage; and that a policy of unmixed selfishness, such as a good many of them are disposed to pursue, is not in the long run profitable either to the profession or to the individual.

ESSAY UPON SANITARY SCIENCE.

[Delivered Oct. 18, 1877, before the American Institute of Architects, by Col. G. E. Waring, jun.]

YOUR committee has announced me for a paper on "Sanitary Science." It would better describe the intention of my few remarks to use the expression "in Sanitary Practice."

Our knowledge of sanitary questions lacks very much of what is necessary to scientific accuracy. Not only are the terms of the art more or less vague, but we are still very far from being certain as to our deductions concerning its almost fundamental principles.

We read and we hear a great deal about "sewer-gas," "malaria," and "zymotic diseases;" indeed, the nomenclature of the subject is copious and minute. Yet when we come to ask ourselves how much of all our theories is based on clearly ascertained fact and on demonstrable conclusion, we are forced to acknowledge the really primitive condition of our study.

Many deductions from wide-spread observations are of great practical value; but thus far they remain deductions only. Certain conditions of soil and surroundings point to the probability of fever and ague, neuralgia, and consumption; but the sanitary student is still in the dark as to the physical processes by which such conditions produce such ailments.

Exposure to the emanations of decomposing filth exposes us to the danger of typhoid fever, or diphtheria, or cerebro-spinal meningitis, or scarlet fever, or black vomit, according to attending circumstances; but whole populations are frequently subjected to these dangers, without an outbreak of any one of these disorders. Physicans can, thus far, only say that the danger exists. When the disease arises, they are usually able to connect it with its filthy source; but they can by no means demonstrate the exact way in which the cause has produced its effect, nor can they tell why the apparent cause so often fails to produce the frequent effect. Sewer-gas has no scientific definition. Its composition may be even more various than are the materials from which it is formed, and there is hardly a gas known to the chemist which may not be found at one time or another in our sewers and our drains. There is hardly a house that is furnished with the usual plumbing appliances, which is not more or less pervaded, day and night, with the gaseous emanations of the drains. The finer the house, and the more complete its modern conveniences, the more certain it is to be subject to these inroads in all its parts.

If sewer-gas were universally poisonous, very few of our first-class houses would be habitable at all. Why it is, that our people so generally live in tolerable health, under conditions which, while they do not always produce, almost invariably accompany, attacks of zymotic disease, no man can say; and until this is known we shall be more modest if we avoid the use of the word "science," confess our scant knowledge, and apply ourselves to the practical avoidance of conditions which we know to be full of undetermined dangers. We have not yet learned why bad air in the house, or outside of it, sometimes produces zymotic diseases, nor why it does not always produce them; but we *have* learned that in its entire absence these diseases do not arise unless brought to us in our food or drink.

The architect, in his relations with his client, is a practical sanitarian, or the reverse. He has far more to do with the health, and usefulness, and long life of the family which he shelters, than the physician can ever have; and he is in far greater degree answerable for its ailments, and its weaknesses, and its early deaths.

It seems to me that his first great duty — before all art, before all economy, before all constructive ability — lies in the direction of thorough sanitary work. Put a tight roof over our heads, wall out the rude wind, and give us sweet and wholesome air to breathe, and *then* go on with your admirable art, and taste, and skill; but, for Heaven's sake, avoid the mockery of building a beautiful and convenient pest-house.

It seems, in a certain sense, like an absurdity to tell intelligent men the most obvious truths, which they already know perfectly

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well; but it may well be the case, here as elsewhere, that well-known truths fail of active realization.

It is a part of my professional work to inspect the sanitary condition of dwelling-houses, in town and country, and to advise as to their improvement. You will pardon me if I say that I have never yet happened to examine a single house which had not radical defects from garret to cellar; and I have frequently been called, as a matter of precaution only, to recently built houses whose owners had spared no expense to make them perfectly wholesome. Of course some of these houses are not built by architects at all, but by the "practical builders" who do so much of the bad house-building the whole country over. There is a good excuse for this bad drainage in houses built even eight or ten years ago, or at least the responsibility attaches in such cases to the owners who should have reformed them, not to the architects or mechanics who built them at a time when the new art of healthful drainage was in its infancy.

But there is only the excuse of public indifference to shield the modern builder in view of his almost universal disregard of simple and well-known methods of wholesome house-drainage. He would consider himself blameworthy if his roof leaked so badly as to destroy the wall-paper of a single room; but he expects no blame — he would often scout the idea that he should be blamed — for a condition of interior drainage which lays the whole household open to an ever-threatening danger.

There is, perhaps, the further excuse of usage. It is not the custom among architects, any more than among physicians, to pay special regard to those sanitary questions which should engage their first attention. The house is built in the usual manner, and the patient is treated for the usual diseases. God cares for the rest, and a submissive people accepts the result.

I do not stand here, gentlemen, to ask you to pay some regard to a new subject, and to consider whether you may not profitably give it a modicum of thought. I ask you to consider, after careful study, whether you should not pay it a very profound regard, and accept it as the one part of your duty to the public, which carries with it a grave question of life and death.

I do not mean, of course, that, under existing circumstances, any real accountability rests on your profession. As such things go, it is the demand that creates the supply; and the people themselves are thus far at fault. The demand has been for handsome houses, or for cheap houses, or for convenient houses; and these you have supplied with great skill and success.

The time is now at hand when the demand will be for healthy houses first of all; and no one can doubt that the enterprise of your order, ever awakened, will achieve a perfection of sanitary arrangement beyond any thing we have thus far conceived.

At present, not one man in ten thousand — literally not one in ten thousand — cares or thinks any thing about this matter, beyond satisfying himself that his house has as good plumbing as other people's houses.

His accustomed nostrils detect no odor, — even where to one fresh from the country the very entrance-hall is tainted with air from the drains; and where he can neither see nor smell offence, he is quiet and content. He has yet to learn that the most serious danger is often unattended by any very marked warning to the senses.

But a change has begun, and we shall soon find that ten in one thousand are bestirring themselves. It will not be very long before public sentiment will turn from indifference to clamoring demand. The people once realizing the miserable condition of their houses (for which, of course, they themselves are responsible), will cast about for a scape-goat; and you will be fortunate, gentlemen, if you succeed in confining their attention to the plumber who has executed their work, and diverting it from yourselves who should have designed it.

Without being in any sense identified with your profession, I have had some knowledge of the degree to which the plumber (the individual or the class), in many instances, guides the sanitary part of the plans and specifications. I am not at all disposed to join in the popular opinion of the plumber. I am brought into frequent intercourse with him, and I have conceived a regard for him as one who does his best under difficult and often tempting conditions. But he is not usually an educated sanitarian, any more than the apothecary is usually an educated physician.

Referring to what I know to be a frequent custom, I would say that the architect is no more justified in leaving the arrangement of supply-pipes and waste-pipes to the mechanic who is to construct them, than the physician would be in leaving the composition of the bolus to the druggist who is to make it up.

In matters of really vital importance the educated professional man should direct every detail of the plans, according to the best light that he can get. He should also exercise such a supervision over the execution of the work as will insure safety at every point.

It would be folly to attempt to say very much about the details of house-drainage work in the few moments at my command here; but there are certain general principles which may be briefly sketched. They are important; and, whether they depend on theoretical knowledge or on practical experience, they are sufficiently well established to guide our practice safely.

1. Effete organic matter cannot safely be retained anywhere within the house, nor anywhere within an unventilated drain which opens into the house, — either directly, or with the inefficient barrier of a water-seal trap.

2. Effete organic matter — whether fæces, urine, food refuse, or other waste — passes more or less rapidly, according to its nature, and according to its condition as to temperature and exposure to air, into a state of decomposition. It is not generally resolved at once into its innoxious elements, but there is an intermediate stage where its molecules re-arrange themselves into simpler compounds (usually gases), which are again changed into their simple and harmless elements, or into oxides.

The chief agent in the rapid change from the first condition to the third is the oxygen of the common air.

3. It is altogether probable that it is in its intermediate condition that effete matter produces its unwholesome effects, — that it is in this condition that it fosters the reproduction of the germs of disease, or the development of whatever disease-producing influence it may possess.

4. Whatever may be the manner in which this foul condition effects its unwholesome influence, its power for harm is much lessened by a copious admixture of common air, — acting both as an oxidizer and as a diluter.

5. All gases — whether the foul air of the soil-pipe or sewer, or any other aëriform matter — are absorbed and given off by water with great freedom. The water in a trap has only a limited effect in retarding the passage of gases from one side of the trap to the other.

6. Air, in the condition which is the very worst in its effect on health, is very often far from stinking gases.

7. Water has the power of absorbing the germs of disease from air with which it is in contact, or of absorbing whatever other agent of infection the air may contain, and of retaining it for a considerable time.

8. Although a water-seal will not prevent the transmission of gases, it does form a barrier to *currents* of foul air, unless subjected to a pressure sufficient to overcome its hydrostatic force.

9. In towns where a proper system of sewerage is provided, and where there is an abundant water-supply, the system of water-carriage is the best means for removing household waste.

10. In the country, the water-carriage system may be perfectly well used, if the absorptive and oxidizing power of the soil be properly employed for its final disposal.

The application of these principles in practice — in the drainage of houses — involves a consideration of circumstances and conditions which vary in different cases. At the utmost they can only guide and control our practical work. The technical details of arrangement, material, dimensions, and construction, all bear with more or less force upon the general result; but we must keep in view the natural laws and conditions which are essential to good sanitary success.

Most existing work violates the first principle that I have laid down, inasmuch as most of our waste matter is retained in the water-trap of the soil-pipe or drain until sufficiently decomposed to pass away in solution in the feeble current; and as the drain is unventilated, even where it is "vented;" and as it has either no barrier at all to the pouring of its exhalations into the house, or only a water-seal which is always ineffective. The decomposition takes place without the presence of sufficient air to carry it quickly to completion, and so establishes the condition most favorable to the production of disease. There is usually a sufficient dilution in the drain or in the sewer to prevent stinking, but not enough to avert danger. In very many cases the cistern or reservoir in the house, by which water is supplied for all uses, is accessible — either through its own overflow, or through intermittent supply pipes — to poisonous gases from the drain, which its contents absorb and with which the water used for drinking is tainted, — and too often poisoned.

Aside from the dangers inherent in the drainage system of the house itself, it is, if in a city, in connection with a vile public sewer, which is bad in principle, faulty in construction, and a sure source of contamination.

If in the country, it is probably a means for conducting into the house the foul pent-up gases of a pestiferous cesspool.

All of these difficulties may be easily overcome. There is not the least *necessity* for any sort of danger in the use of all the usual drainage appliances in any dwelling-house or public building.

As we are now situated with reference to the public sewerage system in the city, and with the prevalent cesspool in the country, we must arrange to protect ourselves against danger from these sources. We must do away with the use of water-traps so situated that they can retain decomposing organic matter where it will do us harm; we must secure a free circulation of fresh air through all soil-pipes and house drains; and we must either turn our stationary wash-basins out of doors, or secure the absolute closing of their waste and over-flow pipes except when they are actually in use.

Especially must the architect, who is the creator of the sanitary condition of the house, learn to apply to its drainage and water-supply system, the same intelligent and educated skill which he now applies to its arrangement and beauty.

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NEW BOOKS.

EDDY'S CONSTRUCTIONS IN GRAPHICAL STATICS.[1]

THIS is a work which may well be in the hands of every student and practitioner of architecture or civil engineering. It discusses the stability of all forms of the arch, flexible or rigid, and the dome also, by means of the equilibrium polygon — now well recognized as the best instrument for graphical investigation. The processes are new, and the method is a general one applicable to all cases; Professor Eddy's use of them is so clear, that no careful reader can fail to understand them. The book is a contribution of material which cannot be found elsewhere. As compared with other methods, this has the advantage of simplicity and of absolute correctness; avoiding the difficulties and uncertainties that render the application of most systems unsatisfactory. It requires no calculation of the thrust at the crown, or determination of the position of the joint of rupture or of the centre of gravity, and seems likely to supersede other graphical methods. Every student of architecture should master it, and he can hardly have a better teacher than Professor Eddy.

CABLE-MAKING FOR SUSPENSION-BRIDGES.[2]

An air of mystery, and to some extent, of romance, has always hung about the building of suspension bridges in this country. We have indeed known that bridges of this class have attained their grandest development in the United States; have been built of longer spans and been put to harder uses here than anywhere else in the world; and we may individually have admired the finished work at Pittsburg, or at Niagara, or at Cincinnati. But just how the thing was accomplished has never yet been fully stated in print; at least, not before the publication of the little book here mentioned. There was at one time a fashion in bridge-building that led to the building of many wire-cable bridges in Europe, and these were very perfectly described in works of the day. Improving upon these, the late John A. Roebling built the many suspension bridges erected by him in the United States. One feature of these, that was peculiarly his own, was the manner of manufacturing the cable in the place where it was to remain; and this has never before been described in professional literature, or anywhere else indeed, with one exception, so far as known. The exception mentioned, curiously enough, was that of a Sunday-school illustrated paper, which some years ago contained a tolerably clear account of the building of the Cincinnati bridge.

The little book of Mr. Hildenbrand will therefore be very acceptable to many who may be curious to learn how works of this kind are carried on. And because the book gives a detailed account of how cable-making is now done in the building of the New York and Brooklyn bridge, the longest single-span bridge in the world (sixteen hundred feet between the towers), it cannot fail to interest the reader still more. To the profession of civil engineers, the calculations given in detail will be subjects of profitable study and possibly of useful reference in the future.

SANITARY CONDITION IN CITY AND COUNTRY DWELLING-HOUSES.

We have also received No. 31 of Van Nostrand's Science Series on "The Sanitary Condition in City and Country Dwelling-Houses," by Col. Geo. E. Waring, jun., which, as it is only a reproduction of papers originally published in this journal, does not call for a more extended notice.

THE ILLUSTRATIONS.

DESIGN FOR PROPOSED RECTORY FOR CHRIST CHURCH, RYE, N.Y. MESSRS. MCKIM, MEAD, AND BIGELOW, ARCHITECTS.

(57 Broadway, New York, N.Y.)

THE rectory is to be built of stone found on the site, laid up in broken ashlar, with brown-stone sills, lintels, copings, etc. The roof is to be tiled. The cost is not to exceed $10,000.

UNITARIAN CHURCH, SOUTH BOSTON, MASS. MR. S. J. F. THAYER, ARCHITECT.

(40 Water St., Boston, Mass.)

This drawing belongs to the series which was prepared for the Portfolio Club, and of which we have already published a number.

THE CAMPBELL BUILDING, CHICAGO, ILL. MR. W. H. DRAKE, ARCHITECT.

(Chicago, Ill.)

The frontage of this building is 77½ feet on State Street, and 145 feet on Van Buren Street. The front is of Athens limestone. The stories over stores are arranged for eight suites of apartments on each floor. The total cost of building completed will be about $45,000. Loring's terra-cotta is used for the cornices on both streets.

HOOK AND LADDER HOUSE, ST. JOHN, N.B. MR. W. G. PRESTON, ARCHITECT.

(186 Devonshire Street, Boston, Mass.)

CORRESPONDENCE.

THE FOURTH ANNUAL CONGRESS OF THE PROTESTANT EPISCOPAL CHURCH.

NEW YORK.

THE Fourth Annual Church Congress of the Protestant Episcopal Church opened its sessions at Chickering Hall in this city, on the 30th ult., with the consideration of the very practical question, "The church-architecture that we need." Opinions, clerical and lay, professional and non-professional, were given; and, as might be expected, there was unity in a few essentials, but diversity enough in the practice suggested to make the advice rather perplexing to the members of the Congress. Among the audience were many of our city architects, anxious to hear, and if possible learn from whatever the discussion might bring forth.

Richard M. Hunt, President of the New York Chapter, A.I.A., read the opening paper, and apparently surprised some of his reverend listeners by his emphatic indorsement of the Greek-cross Byzantine plan as the most satisfactory for modern churches, as appears by the following extract from his paper: —

"In the early part of this century the feeling of dissatisfaction with church architecture, and especially with its unfitness for Protestant worship, led to what is known as the architectural revival. In galleried churches all ecclesiastical considerations are sacrificed to the accommodation of the congregation. The attempt to adapt the basilica for church architecture has generally failed. The great desideratum now is an unencumbered space around the altar. The circular shape is the grandest; but is objectionable because of the reverberation of sound. The oblong form is unobjectionable as far as seeing and hearing is concerned; but it is monotonous. The cruciform shape is symbolical and appropriate; and the nearer we approach the Byzantine church the nearer we come to solving the problem. The Byzantine church undoubtedly offers the best models for Protestant worship."

Bishop Potter of New York took the opportunity, at the finish of Mr. Hunt's paper, to get in a little rub at the architects by recalling a church he had visited in a neighboring city; an admirable structure, with but two defects: "You can neither see nor hear."

Mr. Emlen T. Littell, also of the New York Chapter, A.I.A., was the second speaker; and he boldly espoused the Gothic as the correct choice in church-designing. He said, —

"The church is indeed the temple of God; but it is not for Him alone that it should be built. The temple is the place where the people assemble to be in his presence. The architect of a church, therefore, must take special note, first, of the rites to be performed therein, and second, of the proper accommodation of the people. It is hardly to be presumed that in the selection of the true style to form a basis for our future church, any one will seriously maintain that we have a choice other than the English Gothic. It is the work of the English Church and of the English nation, and we, as successors to both, would scarcely be wise to seek another, even if a better were to be found. New departures are perilous.

"The spirit, rather than the letter, of mediæval times, should be the guide. We must exercise the broadest, the wisest, the most conservative eclecticism. Our architecture must, above all things, be truthful. Our architecture must be symbolical; it must speak to the intellect and soul. The symbols must fill the soul with devotional thought, even when by chance the pulpit sermon only 'preacheth patience.' We must lay under tribute all the resources of art, painting, carving, and sculpture. All these are aids to the purposes for which churches are built, which cannot be slighted without serious loss to the æsthetic qualities of the buildings and to religion. We are such a practical people that we are apt to slight æsthetics, and our buildings and churches suffer thereby. The æsthetic qualities of a church do not depend upon its money value; a fair amount thereof is within the reach of the poorest, with the principle always in view that the church is built for the glory of God as well as for the use of man. The church architecture we need will come to us of itself, not by inspiration, but step by step, though none the less surely."

The non-professional views were laid before the Congress by two papers from members of the clergy. The first was a posthumous paper by Rev. W. A. McVickar, late of Christ Church, New York. It was evidently intended to be a careful and thorough inquiry into the general subject; but being left unfinished by the author, portions of the paper were completed from the rough notes left by him. The spirit of the paper is given in the following summary: —

"'The architect of to-day,' says M. Viollet-le-Duc in his Discourses on Architecture, 'has passed from the possible tyranny of a single princely patron to a servile subjection to many irresponsible masters. Architecture — debated and bandied about among officials, amateurs, academicians, professors, archæologists, antiquarians with a leaning for the Middle Ages, men of science, economists, and monomaniacs — in order to live at all must make a concession to this one, must not offend that, must avoid the persecution of sects, must grope among prejudices, must listen to every one's advice, must direct all its movements in constant fear of envy, hatred, and malice; and when its work is finished no one is satisfied, and the whole town repeats the familiar complaint, "Why do not our architects create an architecture which belongs to our time and country? Here is another building which is neither beautiful nor correct."

[1] New Constructions in Graphical Statics. By Henry T. Eddy, C.E., Ph.D., Professor of Mathematics and Civil Engineering in the University of Cincinnati. D. Van Nostrand, N.Y., 1877. Price, $1.50.

[2] Cable-making for Suspension Bridges, by William Hildenbrand, C.E. D. Van Nostrand, 1877. No. 32 of the "Science Series." Price 50 cents.

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"This is, I believe, no exaggerated statement, and one cannot help feeling sorry for a class from whom so much is expected and who receive so little help from the appreciative knowledge of those for whom they work. I know I shall have your sympathy in the statement that art in its highest form is an inspiration of the Creator, and that art admits of no higher employment than that of a sacrificial accompaniment to the praise and worship of God. In the statement that art is an inspiration of the Creator, we at once rise to the recognition of the fact that art is a quality rare in man's works, but all-pervading in those of God, from whom the artist must obtain his inspiration. The believer, then, is bound to be a lover of art. The possible antagonism between art and religion is an unpleasant phase of the truth; but when men worship her carved work and decorations, and the altar is no longer the Lord's, it is only a question of time when the iconoclast becomes the minister of God's truth, and shatters the work with axes and hammers. The two enemies of art as the true handmaid of religion are the utilitarians, who are content with a convenient meeting-house, and, secondly, those who would exclude from the worship of God that idea of sacrifice which needs art for its exponent. Take, as a single example of the way in which nature is pervaded with the elements of art, the human body, which the Greek, according to his light the most conscientious architect in the world, studied to the neglect of almost all the rest of nature. It is entirely made up of noble lines, and colored according to the true principle of a general harmony of unobtrusive tones picked out with brilliant hues. Taking the human form, then, as an example of the artistic perfection of our Creator, the position of man is that of a pupil in the workshop of an absent master, where he ought to become an architect when he comes to love God as God loves him. After giving an architect a full, clear statement of what the requirements of the building will be, he should be left utterly free to create after counting the cost. What he wants most is time, and that is what he seldom can obtain from an American building committee. 'Growth is slow where roots are deep.' There are some things he cannot do, and some that he will not do. What, then, is the church architecture that we need? and what elements have we that fit us for the weighty responsibilities of determining? None but what comes from our own ugly blunders and the failures of those who have gone before. The principles which I think are settled are first in regard to plan: a nave, chancel, and porch, because they were so ordered in the Tabernacle, and embodied by Solomon in the Temple; a gathering-place, a place for holy meeting, and a holy place of prayer. The chancel will always be put at the east, for there are symbolic reasons that we should worship towards the rising sun. Chancel aisles will give a robing-room on one side, and an organ-room on the other. Towers may rise and develop into spires under the law that beauty is the adornment of necessary construction. First, proportion; secondly, adaptation of means to end; and, thirdly, beauty adorning necessity. The architect who excels in harmony of proportion must succeed, and without it there can be no true excellences in architecture. Proportion mastered, a nearer approach demands evidence of our second law, — reasonable and careful adaptation of means to end. Stone-work should be massive, brick-work smooth, and iron light. The roots of the building must give the idea of stability. On the north side of the building individuality will be gained from mass and outline, while on the south side the sunlight should play on varied projections for the effect of light and shade. Vines should grow on the north side as moss does upon a tree. Ornament in moulding and carving is only to add to the necessary the charm of gracefulness, and to the perfectly appropriate the perfectly beautiful. In exterior decoration the effect of the shadow of the ornament should be borne in mind, and should fall on a plain surface. Interior ornamentation admits of greater latitude. Shadow here has no part to play; there are only gradations of light. Ornament should gather richness as it approaches the chancel and climax. Let me protest against lath and plaster, for it destroys all hope of real ornamentation, and it is not worth it. Let there be a double wall, the inner one of clay, which will receive coloring. The church may well be wainscoted with slabs of marble. In the chancel let there be richer wood-work and brass. On the altar-place gold and silver and fine needle-work."

Rev. C. W. Ward of Providence, R.I., closed the subject with a paper in which he ran riot through all the popular and specious objections which are made against many of our church edifices; and by a sensational style of treatment succeeded in drawing much laughter from the otherwise dignified auditory. Rev. Mr. Ward said, —

"Architecture is an art of the greatest latitude. John Hope calls it an art of direct utility, and Mme. de Staël 'frozen music.' It is both. There are therefore many ways of approaching this subject of church architecture. But the real question before us is what is neither technical nor artistic, but practical and social; not what church architecture is the most refined or correct, not what might be prescribed by the *École des Beaux-Arts*, or a General Council, or a Pan-Anglican Synod, but what we need substantially now and here. We may thank God, if we please, that we are not as other men are, nor even as those Puritans who worshipped in holy barns; but we must remember that their holy barns were an honest and national outgrowth, and when we go down to our own houses we must see to it that we are in this respect justified as well as they. Our danger to-day is that we shall fail to do this; and that what with our abnormal sensationalism, resulting on the one hand in 'holy zebras,' and our abnormal ecclesiasticism, resulting on the other in Gothic anachronisms, our architecture may result in dilettanteism. 'What is the church architecture that we need?' links itself, then, to the still larger question: 'What, on the whole, is the church work that we need?' Now, we need two things: First, we need preaching churches; not, indeed, Sunday circuses, or sabbatical lecture-rooms, or ecclesiastical theatres consecrated to the goddess of pyrotechnic sound, or the demon of histrionic noise, but churches in which all traditional or artistic considerations shall be rigidly subordinated to the necessities of acoustics. We must hear and be heard in spite of clerical sore throats and æsthetic designs alike. Those who have ears to hear must be enabled to hear.

"There are three rejoinders to this. The first is the mediæval retort, by which we are reminded that we are in some way pinned to the skirts of our English mother, or of our Italian grandmother; that there is a taste for the 'dim religious,' the far-in obscurity of cubby-hole chancels, and the 'catholic' fancy for cloistered side-aisles, or the coy flirtations of clandestine lady chapels; whose votaries regard a service the more divine for being incoherent, and more 'churchy' for being mysteriously incomprehensible.

"The second retort is devotional, and makes an issue between pulpit-churches and altar-churches. An honest piety feels bound to choose the altar horn of the dilemma. But an altar-church must not necessarily be a 'deaf church.' A devotional atmosphere is easily united with a pulpit-church.

"The third retort is practical, and we are reminded that we do not know enough about acoustics to build upon them. But we do know something about acoustics, after all. We do know that sound is impeded by draperies; therefore let us do away with cushions and carpets, except when they may be needed to prevent reverberation.

"We must have no more of those high-roof Gothic tie-beams in which the gospel is so often snared like an incautious insect. And we must learn to light our churches from above. We must abolish our Gulf-streams of furnace heat; and we must have a good deal of common air, and as little gas as is incidental to our fallen state. We want, too, more of amphitheatral or paraboliform interiors. The Gothic, classic, and every other 'ic,' as such, is out of court. We shall be articled to none of them. Religiousness of atmosphere is bound up in no single one of them. Only, whatever form is adopted, let the architect count himself a failure who builds his church and pitches it within and without with polychromatic marvels, and then, after all, has to resort to those pernicious clerical backgrounds commonly called sounding-boards, that have consigned so many congregations to somnolency, and so many ministers to oblivion (or Europe). The second demand to-day is for social churches — not indeed, kitchen-churches, or parlor-churches, for the odor of beefsteak is worse than incense, and Mrs. Grundy is as bad as the Pope; but by social churches I mean those which shall recognize and meet the demands so strongly felt for secular work, in the way of reading-rooms, dispensaries, and all such humanizing agencies. Social science has been too long left to the Samaritans, while the priests and Levites have been passing by on the other side; and the Church must realize that prayers for the dead can no longer take the place of linen bandages. The Christian Church is essentially a social church; a parish church should be to-day what the bishop's palace was of old, the centre where the people could find social as well as spiritual life. Let us not have a house of prayer for Sunday pew-holders, or a pleasing spectacle for tourists, or the most correct and unpaid-for building that a church-warden ever looked at once a week; but a family home, with dispensaries and reading-rooms, and, in short, as far as possible, something to supply the wants of those who have no homes of their own. There is very much in that good old Anglo-Saxon word 'house' to make us think when we speak of the 'house of God,' for house means shelter. So would I have our church architecture blended with our social life, that every stone should express the beneficence of our age, expressing itself through the Christian Church; and so would I have it that the antiquary, ages hence, when stumbling on the ruins of our work, might say: 'I have found in brick and mortar the record of a permeative gospel, and by so much have I found the record of a faithful art, as well as of a noble church.'"

BRONZE CASTING.

IT is a most singular fact that melted gold, silver, copper, and iron, if poured hot into a mould, will take the impression that retains on cooling all the details of the pattern from which the mould was made, only when the mould is made of sand. Zinc can be moulded in copper moulds, and that is the principal cause of the low price of spelter or zinc statuettes, known in the trade as imitation or French bronze. The real bronze is an alloy of copper, zinc, and tin, the two latter metals forming a very small part of the combination, the object of which is the production of a metal harder than the pure copper would be, and consequently more capable of standing the action of time, and also less brittle and soft than zinc alone would be.

The original statuette is generally finished in plaster. The manufacturer's first operation is to have it cut in such pieces as will best suit the moulder, the mounter, and the chaser, for very few bronze statuettes are cast all in one piece. Arms and legs are generally put on after the body is finished. The next operation is to reproduce the different parts of the figure in metal. For this the moulder takes it in hand to prepare the mould. He begins by selecting a rectangular iron frame, technically termed a flask, large enough for the figure to lie in easily. To this frame, which is from two to six inches deep, another similar frame can be fastened by bolts and eyes arranged on the outside of it so that several of these frames superposed form a sort of box. The workman places the plaster statuette, which is now his "pattern," on a bed of soft moulding sand inside the first iron frame. The sand used for mould-making is of a peculiar nature, its principal quality being due to the presence of magnesia. Only in one locality in the world is found the best sand, that is at Fontenay-aux-Roses, a few miles from Paris in France. This sand, when slightly damp, sticks together very easily, and is well fitted to take the impression of the pattern.

Once the pattern embedded in the sand, the workman takes a small lump of sand, which he presses against the side of the figure, covering a certain portion of it. Next to this piece he presses another, using a small wooden mallet to insure the perfect adhesion of the sand to the pattern. Each one of these pieces of sand is trimmed off, and a light layer of potato-flour dusted both over the pattern and the different parts of the mould, to prevent them from adhering together. In course of time the entire part of the pattern left above the first bed of sand on which it has been placed, will be covered with these pieces of sand, which are beaten hard enough to keep together. Loose sand is now thrown over this elementary brickwork of sand, if it may be so called, and a second iron frame bolted to the first one to hold the sand together, which, when beaten down, will form a case holding the elementary sand pieces of the mould in place. The workman now turns his mould over, and removes the loose sand which

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formed the original bed of the pattern, and replaces it by beaten pieces, just as he has done on the upper side.

We can now easily conceive that if the mould is opened, the plaster pattern can be removed, and that if all the pieces of sand are replaced as they were, we shall have a hollow space inside the mould which will be exactly the space previously occupied by the pattern. If we pour melted metal into this space, it will fill it exactly, and consequently, when solidified by cooling, reproduce exactly the plaster pattern. For small pieces this will answer very well; but large pieces must be hollow. If they were cast solid, the metal in cooling would contract, and the surface would present cracks and holes difficult to fill. To make a casting hollow, it is necessary to suspend inside the mould an inner mould or "core," leaving between it and the inner surface of the first mould a regular space, which is that which will be filled by the metal when it is poured in. This core is made of sand, and suspended in the mould by cross wires or iron rods, according to the importance of the piece. A method often used in preparing a mould named by the French *cire perdue*, will help to illustrate this. The artist first makes a rough clay image of the figure he wants to produce. This will be the core of the mould; he covers it with a coating of modelling-wax of equal thickness, and on this wax he finishes the modelling of his figure. The moulder now makes his sand-mould over the wax; and when it is completed by baking the mould in a suitable furnace, the wax runs out, leaving exactly the space to be filled up by the metal. The celebrated statue of Perseus, by Benvenuto Cellini, was cast in this way, and it is very frequently employed by the Japanese and Chinese. Sometimes flowers, animals, or baskets are embedded in the mould; and after the baking, the ashes to which they have been reduced are either washed or blown out to make room for the metal. This can easily be done through the jets or passages left for the metal to enter the mould, and through the vent-holes provided for the escape of air and gases.

When the mould has cooled, it is broken to remove the casting it contains; and here is the reason why real bronze is so much more expensive than the spelter imitation. For each bronze a new sand-mould must be made, while the zinc or spelter can be poured in metal moulds which will last forever. In this way the pieces are produced with but little more labor than that required to manufacture lead bullets. These pieces, of course, do not receive the same expensive finish as the real bronzes. When the casting is taken out of the mould it goes to the mounter, who trims it off, files the base true, prepares the sockets which are to receive the arms or other pieces to be mounted, and hands the piece to the chaser. The work of this artisan consists in removing from the surface of the metal such inequalities as the sand-mould may have left, and in finishing the surface of the metal as best suits the piece. The amount of work a skilful chaser can lay out on a piece is unlimited. In some cases the very texture of the skin is reproduced on the surface of the metal. This mode of chasing, called in French, *chairé*, and in English, "skin-finish," is, of course, only found on work of the best class. Sometimes pieces are finished with slight cross touches similar to the cross-hatching of engraving. This style of finish, which is much esteemed by connoisseurs, is named "cross-riffled" or *ribouté*. After the chaser has finished his work, the piece returns to the mounter, who definitively secures the elements of the piece in their places.

The next process is that of bronzing. The color known as "bronze" is that which a piece of that metal would take through the natural process of atmospherical oxidizement, if it were exposed to a dry atmosphere at an even temperature. But the manufacturer, not being able to wait for the slow action of nature, calls chemistry to his aid, and by different processes produces on the surface of the piece a metallic oxide of copper which, according to taste or fashion, varies from black to red, which are the two extreme colors of copper oxide. The discovery of old bronzes, buried for centuries in damp earth and covered with verdigris, suggested the color known as *vert antique*, which is easily produced on new metal by the action of acetic or sulphuric acid. In the fifteenth century the Florentine artisans produced a beautiful color on their bronzes by smoking them over a fire of greasy rags and straw. This color, which is very like that of mahogany, is still known as Florentine or smoked bronze. Bronze can also be plated with gold and silver, nickel and platinum, like every other metal. — *New York Tribune.*

PRESERVING TIMBER.

THE subject of preserving timber from decay is one that has for a long time excited attention in Europe. There wood has become so scarce and valuable that any successful method for accomplishing the results mentioned could not fail to be appreciated and taken advantage of. In the United States it has been somewhat different. In the past, timber has been abundant and cheap, so that artificial methods for preserving wood here have not commanded general attention. The fact is becoming patent, however, that even here, where timber has been so abundant, the quantity available is rapidly lessening. It is evident that something must be done to diminish the increasing drain upon our forests. For some forty years the method of preserving wood by filling its pores with creosote oil has been known and used in Europe, and its perfect reliability is no longer there a matter of experiment. Railway ties laid in 1840 are still in use in England, and piers and other marine works constructed in 1850 from creosoted timber are perfectly sound to-day in localities where, had they been built in timber in its natural state, they would have been totally eaten away by the teredo within four years. In the United States but very little comparatively has been done in this matter, partly for the reasons previously mentioned and partly because suitable works for creosoting lumber have not been in existence. Mr. Ira Hayford for the past ten or twelve years has devoted his time and energies to this subject practically. In 1872 and 1873 he was engaged at the Charlestown Navy Yard by the government in creosoting the timbers of the "Vandalia;" and white oak timbers two feet square and sixty feet long were impregnated to the heart with the oil. Mr. Hayford's creosote system is based on the fact that the sap and water must first be withdrawn from the wood, and then the preservative oil forced into its empty pores. The effect of the heat used in the process is to cook the albumen of the wood, and destroy its liability to putrefaction. This part of the process alone would add greatly to the length of life of timber.

Mr. Hayford has improved his processes and machinery of late, so that the work of infusing the creosote is done more perfectly, quickly, and cheaply than formerly. His cylinder is made of half-inch iron and double steam riveted. It has been tested by a cold hydraulic pressure of two hundred pounds to the square inch. At either end are heads which open, being in the form of a half globe, of five-eighths inch flange iron. These heads swing on a hinge, and when closed are held in place by bolts worked simultaneously by a large screw.

A railroad track three feet six inches wide runs through the cylinder and onward outside at either end. Iron cars containing the timber run into the cylinder, and when the creosoting process is over they are withdrawn. The capacity of the cylinder is 20,000 feet of timber, or 500 railway ties. When the cylinder has been packed, it is heated to about 225 degrees by steam running through 1,400 feet of coil from a boiler of 85 horse-power. On one side of the building is a pump having a steam cylinder sixteen by eighteen inches, and an air cylinder twelve by eighteen, the latter being provided with a water jacket to keep the air cool. This pump was made by the Blake Pump Manufacturing Company, under Mr. Hayford's patents. In order to prevent the sap of the wood from evaporating too rapidly under the steaming process and causing the wood to crack, atmospheric air is forced in by the air-pump at a pressure of from twenty-five to thirty pounds to the square inch. When the sap is evaporated the steam is cut off, and the apertures of the cylinder opened to allow the steam inside to escape. Then the vacuum pump is used for the purpose of drawing off the moisture and vapors of the wood. A vacuum of from twenty-six to twenty-eight inches is attained, by which means the timber at the end of this stage is left dry, the sap having been all extracted and the pores of the wood opened for the reception of the oil. The proper valves having been opened, the vacuum pump again becomes a force pump, and pressure is applied to the creosote in a large oil-tank sunk in the floor.

The creosote, heated to the boiling point, is thus forced through a series of perforated pipes in the main cylinder, from which the oil falls in a continuous shower upon the timber. When the oil in the tank is exhausted, the connection with the tank is closed, and pressure applied to an air-injector below the cylinder, into which the oil falls which has not been absorbed by the wood. The air, passing through the oil with great force, carries it back through the perforated pipes, and keeps up a continual revolution until the wood has been thoroughly impregnated. The timber is thus thoroughly creosoted, the process requiring one day. That the creosote is thoroughly infused through the pores of the wood, is evident by sawing off a section in any part, and examining it. For use on land about seven pounds of oil per cubic foot of timber is considered sufficient for thorough preservation, but for marine timber more is used.

This process is applicable to all kinds of soft or hard wood, and a great consideration is that it at the same time gives a thorough seasoning to the timber. — *Boston Journal of Commerce.*

NOTES AND CLIPPINGS.

THE NEEDLES OF CLEOPATRA. — The following statements embody some views held by Mr. Erasmus Wilson, who originated the idea of carrying an obelisk to England: The five monoliths known as Cleopatra's Needles stood originally in the city of On, or Heliopolis, in front of the temple wherein Moses received his education in the laws and philosophy of the Egyptians. They are therefore monuments of an era in Egyptian history closely interwoven with the history of the Old Testament; Rameses, one of the hewers of the obelisk now afloat, having probably been the oppressor of the Jews, while his successor, Menephtah, was undoubtedly the Pharaoh of the Exodus. Mr. Wilson also states that an ancient sycamore-tree in the village of Mutareeah, adjacent to On, is believed to have given shelter to the Holy Family in their flight into Egypt.

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THE BROOKLYN BRIDGE. — The top of the Brooklyn pier of the East River Bridge presents a scene of comfort as well as activity. While the men are engaged in running the wire over the river, Engineer Farrington, in a small but comfortable building erected for his benefit, directs the movements of the workmen, and occasionally comes forward to make some alteration in the position of the cables or machinery. This is the first winter that preparations have been made for the comfort and accommodation of the workmen. Last winter the men were engaged upon such work that it was impossible to provide for their comfort while working; but this year small houses have been erected upon the cradles to protect the men. Other arrangements have been made for the comfort of the men during working hours. The cable-making machinery, on the Brooklyn anchorage, is on the same general plan as that used in making the cables for the Covington and Cincinnati suspension-bridge, with some changes to suit different requirements. Mr. Farrington stated yesterday, that he had thus far completed twenty strands, and placed them in position. The men are now working upon the twenty-first. As fast as the wire is galvanized, it is placed in the machinery and sent over the river on the endless working rope, thereby being placed in position. Work on the approaches is going forward rapidly. On the Brooklyn side the second pier has been completed, and in a few days the men will have finished pier No. 4. On the New York side, one block of buildings on Pearl Street, between Cliff Street and the Harper Building, has been demolished, while the interior of the buildings on the opposite side have met with the same fate. As the outer walls of these buildings will not be in the way of the bridge for some time, they have been left standing. — *N. Y. Tribune.*

TAUNTON WATER WORKS. — The New Bedford, Mass., *Mercury* says: "The Superior Court at Taunton has been occupied for the past week in the trial of three cases growing out of the establishment of the Taunton Water Works, and some interesting features in hydraulics have been under discussion. These works are upon the Holly system, and consist of a filter basin about 400 feet long, located by the side of Taunton River. From the basin, which is several feet below the bottom of the river, and into which water filters, the engines pump directly into the pipes, without any reservoirs whatever. The land slopes gently upward from the basin for about 300 yards; and the petitioners claimed that the water came from the land, and not from the river. Upon the question many scientific gentlemen testified, including Prof. Hayes of Boston, Mr. Herschel of Boston, civil engineer for the petitioners, and Prof. Nichols of the Technological Institute, Mr. Rotch of Fall River, and Mr. Martine, civil engineer for the city. Some thirty witnesses have been examined, and elaborate experiments by tubular wells and otherwise have been made to ascertain the real truth. The jury were charged Tuesday morning by Judge Brigham, and a verdict was rendered for the plaintiffs in all their cases."

A CORNER IN RAILS. — The Bessemer-steel manufacturers, after a session of several days in this city, perfected among themselves an agreement to advance the price of steel rails; but when the effort was made to obtain the signatures of the operators embraced in the scheme, one of them refused to attach his name, rendering the project inoperative. The substance of the agreement was this: Two dollars was to be paid into a general fund for every ton of rails manufactured, and the accumulation divided at stated periods among the companies owning the Bessemer process. Rails were to be furnished at Troy for $50 per ton; at Cleveland, for $50; at Chicago, for $51; Joliet, Ill., $51; St. Louis, $53. The mills at other cities were to be unrestricted in production, and comprised the Edgar Thomson Works, of Pittsburg; Cambria Iron Company, of Johnstown, Penn.; Pennsylvania Steel Company, of Harrisburg; Bethlehem Iron Works, of Bethlehem; and the Lackawanna Iron and Coal Company, at Scranton.

These mills, it is argued, cannot manufacture more than 250,000 tons of rails in a year; and, as the consumption for next year is estimated at 400,000 tons, the six other mills having the Bessemer process would have only 150,000 tons divided among them; but it was claimed that, in addition to the greatly advanced price per ton, they would be amply paid for their restricted work by their shares in the $500,000 royalty on 250,000 tons to be paid in by the unrestricted companies. Existing contracts were not to be disturbed by the scheme; and the New York Central Railroad contract, at $40 per ton, was to be fulfilled at that price.

The new combination, on the other hand, it was alleged, would result in a rich harvest to the unrestricted companies, who would increase the price to $49 per ton at once, take large contracts for the West and South at least $1 per ton lower than the combination schedule, and thus draw the trade to this State. For instance, the Vulcan Iron Works of St. Louis would be required to charge $53 per ton, an increase of $10 over present rates, which would divert its trade to Pittsburg, where the rails could be secured for $49, or even less. — *Philadelphia Record.*

AMERICAN EXHIBITS AT PARIS. — A cable despatch from Paris states that a semi-official denial has been made of the report that the French Government will allow Americans to take part in the Paris Exhibition, even if no commission is appointed. Gentlemen prominent in the movement for the representation of this country at Paris said yesterday that the denial could not be official, for Duke Decazes, in a letter which has been published in the *Tribune*, declared, "If the Minister of the United States takes under his protection the applications of his fellow-citizens to us, we will accept their requests, and act upon them."

GRECIAN STATUES IN THE DUOMO AT FLORENCE. — The workmen engaged in repairing the front of the cathedral at Florence recently, in removing a thick coating of plaster at one of the corners of the building, discovered seven marble statues, pronounced by connoisseurs to be of the best period of Greek art.

FIRES IN CHICAGO. — Below is a list of the fires for the month ending Oct. 31: —

Alarms, 42; stills, 9; total, 51. Class of buildings — Frame, 25; brick, 13. Occupation — Dwellings, 6; barn, 9; saloon, 4; and 1 each of tea-store, boiler-room, photograph gallery, lumber dry-kiln, theatre, tenement, elevator factory, horse-shoe nail factory, bakery, shed, butcher shop, bung factory, honey and sirup factory, gents' furnishing store, junk shop, and mattress factory. Origin — Traceable to maliciousness, 6; mischievous boys, 3; fraudulent intent, 4; defective furnace, 2; spontaneous combustion, 2; refuse match or cigar-stub, 4; stove-pipe run through and setting fire to plastered partition, 1; woodwork over boiler exposed, 1; movable gas-jet turned against wood, 1; ignition of kerosene from which lamp was being filled, 4; lamp tipped over in drunken row, 1; children playing with matches, 2; sparks falling among shavings and refuse, 2; wind blown down smoke-stack, 1; foul chimneys burned out, 5; ignition of clothing hung around stove to dry, 1; insufficient flue, 1; heated journal, 1; defective flues, 3; false alarms, 6; total, 51. Actual loss, $50,470.

TO THE ARCHITECTS OF THE SOUTH-WEST. — Official investigation shows that more than a dozen court-houses have been burned in Texas by incendiaries, who were interested in destroying records therein contained, which might be used as evidence to convict them of selling thousands of acres of land on fraudulent deeds. About sixty persons have been arrested as engaged in the plot to cheat the government.

NINETY-NINE FAMILIES IN ONE HOUSE. — The death of Tihmintz Moritz, a child nine months old, at No. 98 Mott Street, New York, was reported at the Board of Health recently, and a certificate of burial asked for. Upon investigation it was found that the tenement-house in which the death occurred contained ninety-nine families, or nearly five hundred persons. The wretched families are living, in many cases, in but a single room.

FALL OF A BUILDING. — The rear wall of a two-story brick stable, at No. 237 East Twelfth Street, New York, fell Nov. 4, damaging the building, and crushing a carriage. A foundation for a new building had been dug close to the wall, and had undermined it.

EXPLOSION IN A SEWER. — A lighted cigar was carelessly dropped through an aperture in a sidewalk in Liverpool, recently, with the following result: the pavement opened with an explosion; flames issued forth, and a stone weighing three hundred pounds rose in air. The sewer-gas continued to burn for a long while after the explosion. There are several morals that might be drawn from this occurrence, but most of them will be obvious to the reader.

THE FLOATING NEEDLE. — A private letter printed by the London *News* gives some interesting information respecting the voyage of Cleopatra's Needle. The vessel containing the obelisk pitched tremendously during the transit, her nose dipping under and rising above the water at an average of fifteen times a minute, and the strain upon the towing ropes was tremendous. The maximum speed attained was only six knots an hour.

A CRITIC ON HIS OWN WORK. — Mr. Ruskin's Oxford lectures this year will consist of a series of twelve readings in "Modern Painters," collecting the passages which the author thinks likely to be permanently useful.

PRIZE OF BEAUTY. — The French journals are laughing at the announcement in a Spanish paper, that a prize, or rather sixty-one prizes, are to be awarded during the coming exhibition at Paris, to the sixty-one most beautiful women in the world. The decision is to be made by a jury formed by a lady and gentleman from each nation. If the most beautiful of all, the Queen of Beauty, be poor, her expenses are to be paid, she is to be regally clothed, and go home again with a magnificent prize. As the decision is to be made partly by the aid of photographs, it is to be feared that unless the fanciful Spanish journal prints a contradiction, many a Spanish señora or señorita will waste her money in photographs.

INCOMBUSTIBLE PAPER. — Two Spanish gentlemen of Salamanca have just obtained a patent in Spain for making writing-paper incombustible. A number of experiments have been made with the process, and the results are said to have been very satisfactory. The paper will not burn, no matter what may be the intensity of the heat applied. A single sheet submitted to the direct action of a flame will carbonize, but does not take fire. If a roll of prepared paper is placed in the hottest fire, the outside leaves will carbonize, and the edges for a short depth; but the interior remains unaltered, the writing or printing being perfectly legible. Papers already written or printed upon may undergo the process without injury. The patentees expect to make an arrangement with the government to apply the process in the manufacture of the paper used by it for public business.

A LARGE TANK. — At Kanthalai, Ceylon, there is a magnificent tank on a scale so enormous that it would now cost more than five million dollars to erect it. It was constructed about A.D. 275. Still more remarkable is the great store tank of Kalowewa. Its circumference is supposed to have been hardly less than thirty miles, and it was kept full by two rivers. Channels extended from it over fifty miles, which conveyed an unfailing supply of water to certain large store tanks and thence to minor village tanks. The Ceylon Government proposes to gradually restore many of these great works. Here we see how the ancients prevented famines.

THE TRANSPORT OF MONOLITHS. — The huge granite monolith which supports the horse of the statue of Peter the Great at St. Petersburg was rolled from Finland to St. Petersburg upon cannon-balls.

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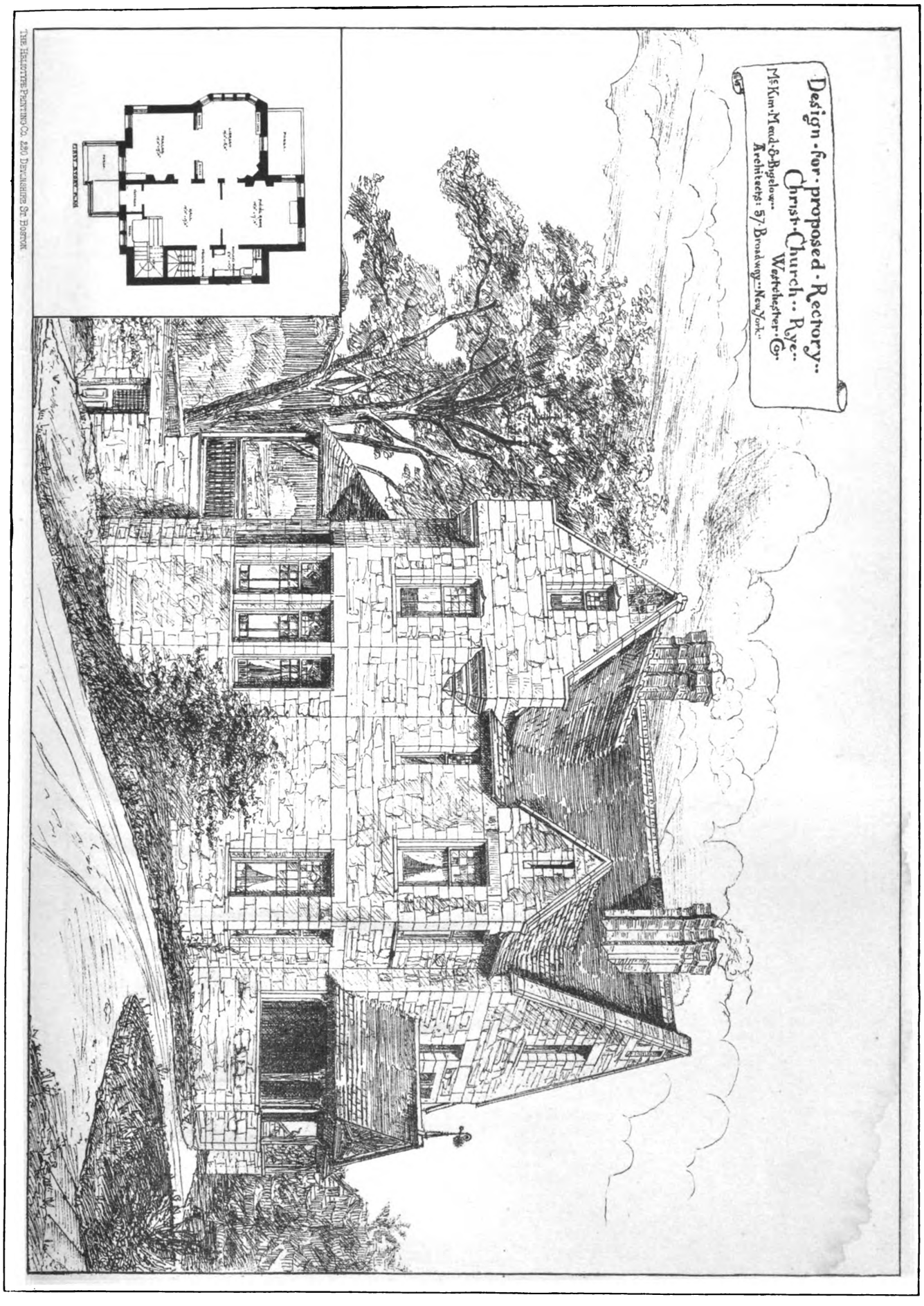

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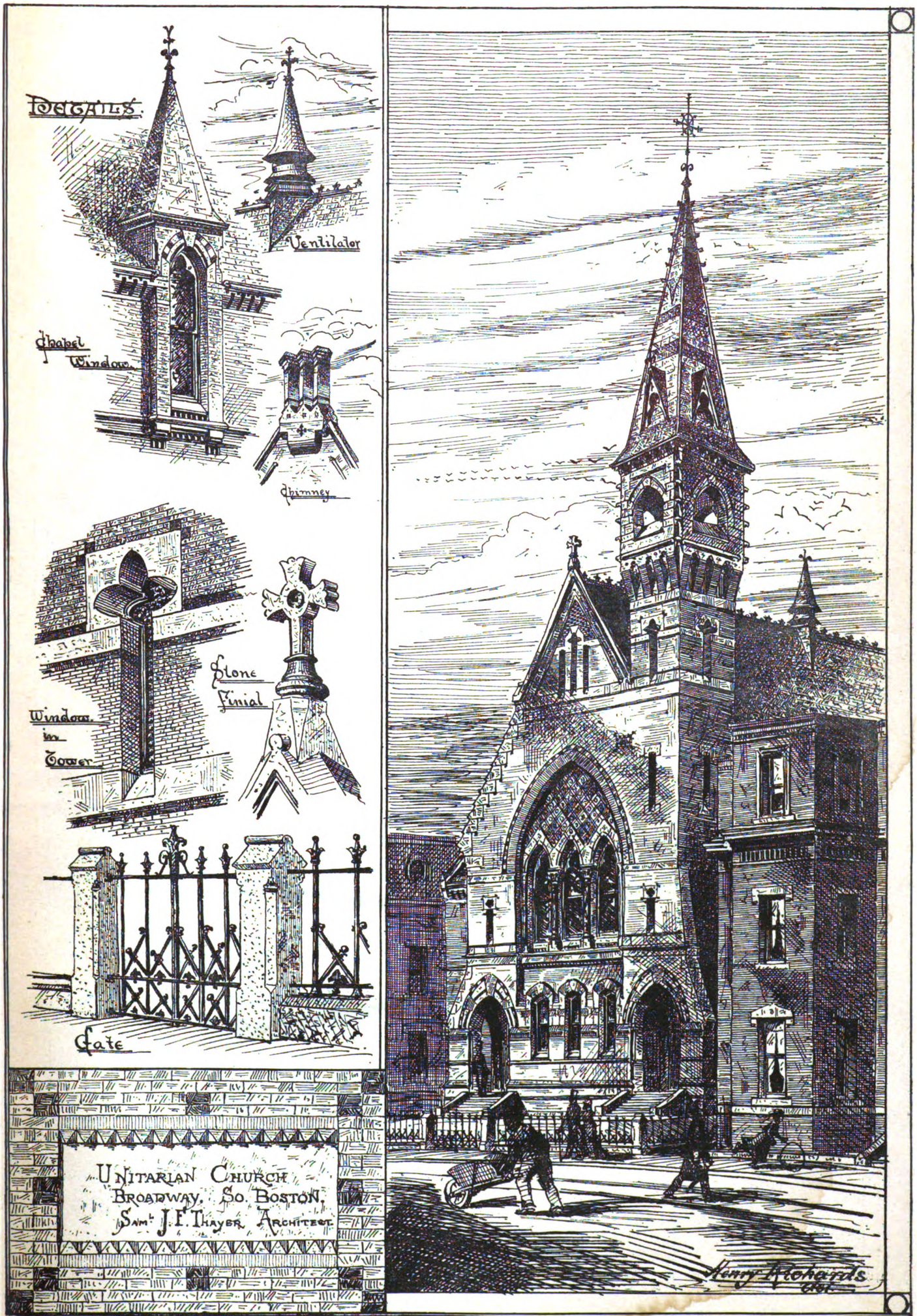

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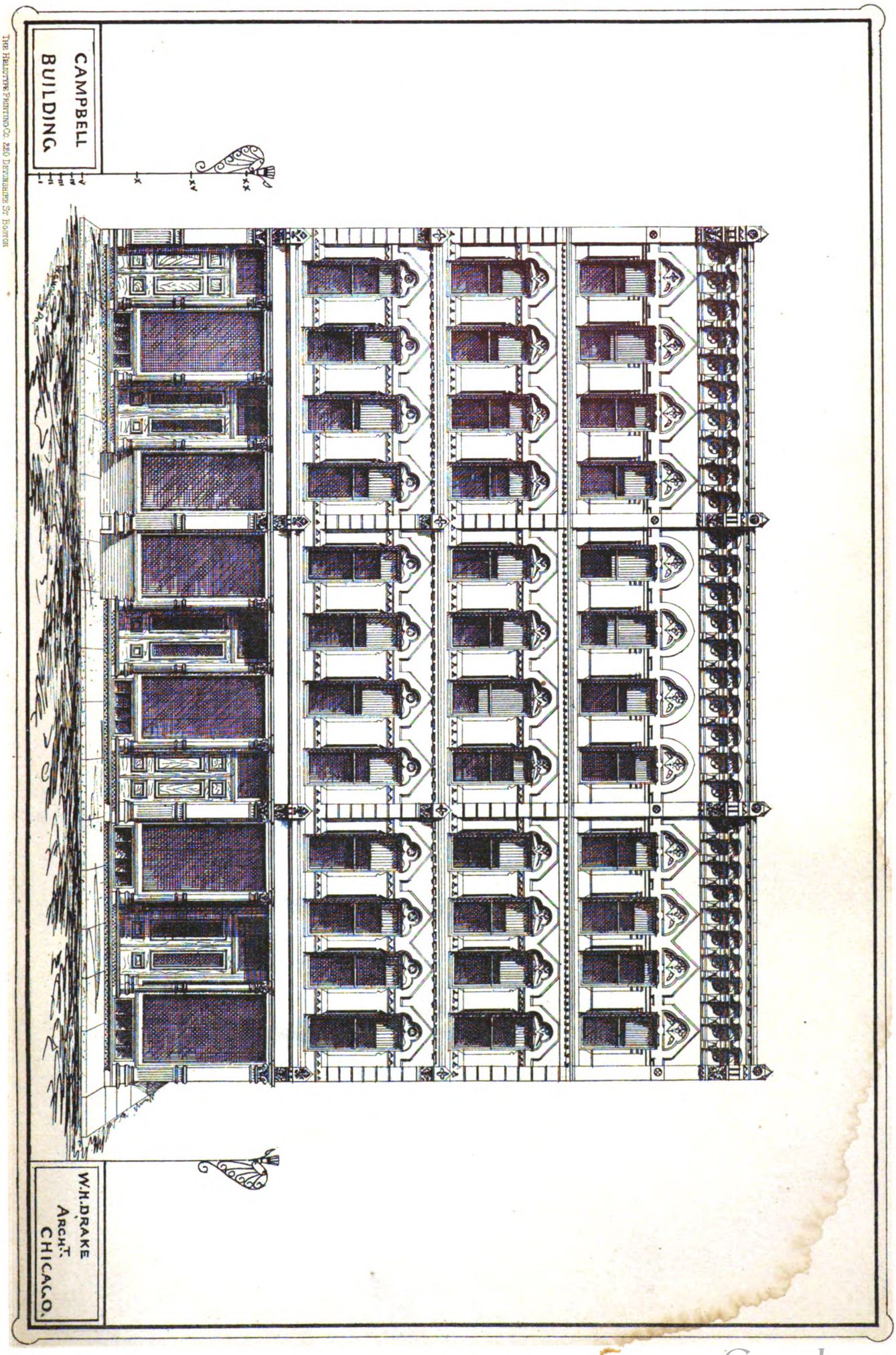

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ELEVATION OF

A

HOOK & LADDER HOUSE

FOR THE CITY OF

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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THE bill offered in the House of Representatives by Mr. Hewitt to secure representation of the United States at the French Exhibition, with the amendments he has added to it, authorizes the President to appoint a commissioner-general who shall be paid five thousand dollars, and twenty additional commissioners at one thousand each. Of these twenty, nine are to be scientific men, one to report on each of the nine chief groups into which the exhibits are divided; five are to represent commerce and manufactures, and five are to be practical artisan experts; the twentieth being appointed to make a general report on the character of the exhibition and its results. The President is also empowered to appoint a hundred honorary commissioners, to report on special subjects, and to serve without pay, with the proviso that none of them shall have any interest in any article exhibited in competition, or be agent for an exhibitor. This last limitation ought certainly to be superfluous, and would seem to be an unnecessary slur on the character of a President's appointments, were it not that the tendencies of American politics make it desirable to keep such matter-of-course restrictions before people's eyes. An appropriation of not more than $150,000 is provided for a collective exhibit on behalf of the government, which is to be under the care of the commissioner-general. A further provision, of which the newspaper report is not very intelligible, is to furnish free transportation to and from France, in government vessels, of American articles which were contributed to the Centennial. This restriction we are at a loss to understand. The limitation of free transport to articles that have already been exhibited at one world's fair, and which are therefore, in many cases, just what should not be sent to a second, seems absurd; and we are inclined to doubt whether it has been correctly reported.

THE people of the country are getting impatient at the neglect of Congress to take up a matter in which delay is disastrous, which ought to have been settled at the last session, and might be settled now with no appreciable expenditure of time. A number of leading New York business men, who represent, the papers say, five hundred millions of capital, have just memorialized Congress on this subject, reminding them that we are keeping the French Government waiting, that time is short, and that the exhibition is a very important thing for our people. "Purely as a commercial undertaking," says the memorial, "without regard to the friendship and courtesy we owe to the French nation, we should be amply repaid, as whatever tends to build up and extend our manufacturing and exporting business in the same proportion benefits our agricultural interests. There is no doubt that our centennial exhibit has benefited the country enormously, but it is as nothing compared with the benefits that will accrue from the Paris fair." A meeting for the same purpose will have been held in Philadelphia before this paper is issued. We will not presume to suggest that Congress is not busily occupied with matters still more important than the Paris fair, important as that is. There is, however, a maxim, which men whose minutes are precious find sound and wholesome, that when many things have to be done, of which some are more essential than others, efficiency and economy of time are promoted by taking the less essential first.

MEANWHILE the Centennial exhibits which foreign governments have presented to ours remain without proper housing, distributed among various inappropriate and unsecure buildings where they cannot be displayed or even seen, simply because there is no place to put them. There is a great accumulation of other things that are kept by the government as memorials, or curiosities, or specimens scientifically interesting, some of which are in the Patent Office, or were before the fire, and a great many cumbering the halls of the Smithsonian Institute. There is a plan on foot for building a Government Museum, in which these and other like things which will gather from time to time may be securely kept, and fitly arranged. An estimate, or guess, of the cost of such a building is set at a quarter of a million of dollars. There is no doubt that such a museum, if it can be had, will be extremely valuable. A complete museum of American ethnology and archæology is getting to be a very important desideratum. The government has opportunities for forming such an one far greater than those of any individuals, and can afford, we may add, to leave Cardiff giants and petrified men to private collectors.

WASHINGTON despatches have given abstracts of the annual report of Mr. Hill, the Supervising Architect, to the Secretary of the Treasury. The report recommends, it is said, that the sales of Government property, which have heretofore been recommended, should be deferred till the real estate market improves; a recommendation which a private holder would be thankful to follow, who could hold his unproductive real estate untaxed. It also recommends a separate building for the Bureau of Engraving and Printing, and some new provision for storing the files of papers in the Treasury Department outside its building. The fifteen per cent granite contracts bequeathed by the earlier management of the office have been reconsidered; and modifications of them in favor of the government are secured in the cases of the buildings now going up in Philadelphia, Cincinnati, and St. Louis. There remain in force those for the Custom House at Hartford, and the Post Office extension in Boston. The penny-wise policy of some late appropriations of Congress is shown by the fact that work will presently be interrupted by their failure on this last building, as well as on the Custom House at Fall River. The extension of the Boston Post Office was interrupted for the same cause in 1876, and only resumed by help of a small appropriation last spring, which is now nearly exhausted. Mr. Hill reports unexpended balances of appropriations for thirty buildings, ranging in amount from a few hundred dollars to near three hundred thousand; the principal ones being, for the Cincinnati Custom House and Post Office, $289,185; for that at Chicago, $109,284; at St. Louis, $215,111; at Albany, $107,125; at Memphis, 101,859; for the Philadelphia Post Office, $188,967; and that at Covington (Ky.), $144,630.

OUR readers are probably aware of the dissatisfaction of the people of Illinois at the amount of money that has been spent on their yet unfinished State House, and of the complaints of extravagance that have been made against their commissioners, into whose administration a long inquiry has been making. These things have been a standing topic with the Chicago papers, though we have not felt called upon to give up much space to them. The building has been in hand since 1867, its cost being increased from time to time by changes in the design, till three and a half millions have been spent upon it; the dissatisfaction has grown so far, meanwhile, that the last appropriation of half a million made in the Assembly for the completion of the Capitol was thrown out by the popular vote, and remains of no effect. A committee of investigation appointed by the Senate last spring has lately reported, censuring the commissioners for their

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expenditure. They say that "The larger portion of the expense of the building over the estimates has been caused, in the opinion of your committee, by the excessive and elaborate ornamentation and by the many changes from the original plans. In ornamentation, the supreme court-room may be cited as an instance of excessive decoration, — a room upon which a large sum of money has been worse than uselessly expended. The change of plans for the dome has involved another additional heavy expense of $295,388.57;" and that in many parts the work and material are so poor that they will have to be replaced. They recommend that the Board of Commissioners be abolished, and that Mr. Cochrane be removed from his position as architect. We have not seen it charged, however, that the commissioners had been guilty of any worse fault than extravagance, or that the money appropriated had not actually gone into the building.

THE New York Court House, on the other hand, — a building whose history has been a proverb, and whose cost dwarfs that of the Illinois State House into insignificance, — is apparently in a fair way to cease to swallow money. We are afraid to say how many years it had been building, but it had cost twelve millions and a half, and was still maintained in productive incompleteness, when the ring whose nest-egg it had been was broken up, and the new commissioners appointed. Since then, under the charge of their architect, Mr. Eidlitz, it has been somewhat modified; the southern portico being enclosed to give more internal room, and the design of the dome changed. The dome, by the way, in its new form, is accused of the same sins against congruity of style as were charged against the alterations of the Advisory Board in the Albany State House. Now, it is said, the last considerable contracts for the work that is to be done have been awarded, and it is expected that the building will be absolutely finished next summer. The whole amount expended and contracted for thus far by the commissioners, says the *Evening Post*, is about three hundred and eighty thousand dollars; of which thousands twenty are for iron-work, eighteen for carpenters' work, forty for masonry, and three hundred for stone-work; and only a few thousands more, spent in repairs, will be needed to finish the whole.

WE are not sorry to receive the letter from "W." which we print in another column; for if we have laid ourselves open to misconception we wish to set ourselves right. His drift, as we understand it, is that we have unduly exalted the technical education of the schools; and he rather implies that we have frowned upon private education or self-education. We have no controversy with education, wherever it is got, if only it be good education. We are far from wishing to close the doors of the profession against the poor or struggling; but only against the incapable and ignorant, whether they are "graduates" or 'prentice-boys. All that we have ever claimed in behalf of training can be met by private training, provided it be thorough. We have argued lately, and shall again, that for the protection of the public, an architect should be able to show a warrant for his education; but he may show it either by a certificate of what he has been through, or by submitting his work to the test of a competent examiner. It is fair to expect him to be willing to do one or the other of these things. It will not be by any means a panacea against bad work, but it will be a distinct step in advance, when the public insists on one of them. That we have too little practical knowledge of architecture, is indisputable; but that we have too much "scientific" knowledge, is, we believe, a most mischievous heresy. The rate at which public and private buildings have been tumbling about our ears during the past year, is indication enough that our theoretical knowledge is at least as deficient as our practical. The blunders certainly are not all committed by the untrained; but to say they are as a rule the work of graduates, is gratuitous. They are the result of ignorance or carelessness; and though training is not a specific, it is at least some safeguard, against these faults. We may remind our correspondent, by the way, when he says that art is the gift of Heaven, that he confounds natural aptitude for art, which is a gift, with its execution, which is a matter of education.

ONE word about self-education. Constable is said to have retorted, when some one was extolled to him as self-taught, that he must have had a very ignorant instructor. It is a common saying, that self-made men are half-made men; and as regards education it is very apt to be true. This we say, not contemptuously, but in all seriousness. A man who undertakes to be his own teacher sets himself an extremely difficult task. Most people find it hard enough to do the work of either teacher or pupil: he who undertakes to do both in one is at an unreasonable disadvantage — unreasonable, that is, unless it is absolutely necessary. If he cannot escape it, it is to be accepted manfully as one of the conditions of a hard lot in life. All honor is due to those who can hold their own against it, and work their way to the front. They are necessarily men of exceptional strength or ability, for only the fittest can survive such a trial. It is a mischievous delusion, though a popular one, to confound the quality of the men with that of the process which they survive. The survivors may be admirable, but their way of education is a most imperfect one, and involves an enormous waste of time and strength in the mere overcoming of difficulties which might be removed beforehand. If a man who has educated himself does not realize that the work could have been done better and more economically in another way, it must be simply because he knows no other way. We could point out architects who have come to the front rank of their profession in the United States without any of the opportunities for training which are now open to those who will succeed them; but they are the very men who are foremost in urging that these opportunities should be made the most of.

ARCHITECT AND CLIENT.

III. — CONSULTING ARCHITECTS.

THE difficulties which we have considered in our last two articles are needlessly aggravated, it seems to us, by the unwillingness of architects to work together, and the consequent feeling of the client that he must get rid of one architect before he can get any help from another. It would be a great gain if this feeling and the offishness in the profession that calls it forth could be removed. As we said, an architect's work is tentative, and every problem he undertakes admits of many solutions. In case of an undertaking of great importance or difficulty it may be desirable to have not merely a good solution, which could be expected from any capable architect, but the very best that can be had. It is to meet such cases that competitions have been devised; but a competition, while it has its own advantages, lacks those of a consultation; it is simply a means of giving a client a choice between several designs, and by its very nature excludes consultation. The kind of light that is thrown by different minds working over the same thing, comparing, interchanging, and assimilating ideas, is altogether wanting in it. There are times, too, when the occasion hardly warrants the formidable machinery of a competition, but when the client finds that it would be to his advantage to have the help of more than one architect.

We are sure that many of the troubles which come up between architects and their unsatisfied clients might be relieved without a rupture if it were considered the proper thing to call another architect for consultation when things seemed to be going wrong, as they sometimes will, — when the client seems to be exacting beyond measure, or the architect unlucky in his attempts to suit him. In other professions we are used to consultations. An important case of law may engage the services of several counsellors; a critical malady calls out a consultation of physicians; only the architect stands alone, whatever his difficulties, or the pressure of his responsibilities, and brooks no rival near his throne. There is one obvious class of cases, and not uncommon ones, in which a different practice might be for the benefit of the profession and of their clients. Young men, by the desire of friends to help them on, or by the chances of competition, are often put in charge of work for which their experience hardly qualifies them; and dissatisfaction or even disaster not seldom follows. If it were understood that an architect of unquestioned experience and skill were in reserve, and that the most important parts of the work passed under his eye, many an enterprising young architect might be saved an unhappy breaking down, and his work a disastrous failure. It might

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take away, in fact, much of the special danger of general open competitions, — that the selected design may prove to be the work of some one to whom the persons who have the work to give will not dare to intrust it, or that they may be misled through ignorance into trusting an unfit person to their injury.

There is another respect in which a habit of architectural consultation might be of service at once to clients and to the profession. The patronage of architects, like that of other artists, and perhaps more than that of most professions, tends to follow fashion, and to load certain favorites with more work than they can do well, while their capable but less conspicuous fellows are neglected. No doubt it is the abler men on the whole who are thus selected; but it ends in their having more to do than they can put their full strength into, and so either throwing off their work hastily or delegating the greater part of it. In the first case they work below their best, and the work as well as the profession would gain by a more even distribution. In the second, it might as well be delegated to some one who would have the credit of his part in it. In either case the client might find it to his advantage to use the zeal of a less crowded practitioner, while he got the name and as much of the attention as he now gets of the more famous one by a system of consultation. It would have at least the lively advantage of transferring the burden of many conferences with the client and contractors to the junior practitioner. Every busy architect knows to his cost how excessive a portion of his time is taken up in such conferences, often, perhaps usually, to such a degree that the only time left him for study of his work is night time. We are inclined to think, also, that the establishment of such a practice would be a check to the encroachments of the class of clients whose aim it is to get work from several architects and pay only one, whether by formal competitions or by plans asked for on approbation. If it were an established principle that architects might be employed together, but that they must be paid together, there would probably be less trouble from this source.

But whatever be the general advantage of a system of consultation, the most annoying embarrassment from which it would give an escape is that from which we set out, — a settled dissatisfaction between client and architect. Two cases come to our recollection, which illustrate the question from different sides. In one, a client who was displeased with the way in which his work went on under one architect, asked another to take his place. The second architect utterly declined to take up the work, on the ground of professional etiquette; and the client went away aggrieved, with the reasonable complaint that it was hard, if the fact that he had been badly served by one architect must make it impossible to get help from any other. In the other case, a client had a design from his architect which was entirely satisfactory in plan and arrangement, but all the exteriors which were offered failed to please him; and he appealed to a second architect. The second put himself into friendly communication with the first, who declared that he had tried sufficiently to please his client, and was very ready to have some one else try. A design submitted thereupon by the second was accepted, and the work carried on amicably together under direction of the first, who as architect in charge was not displaced.

There are however, two considerable obstacles to any system of consulting architects, and especially of what we may call supplementary architects. One is professional pride. This shows itself in the tacit assumption that one architect is as good as another, which we know is not true; also that to call in a second architect is an indignity to the first, and implies his inferiority. This assumption is not necessarily any truer than the other. Physicians do not consider it an indignity to have a consultation called in a difficult case; and in architectural practice a difficult client is quite enough to make a difficult case. Nor need it be assumed that the consulting architect is superior to his colleague, since everybody who is experienced in the practice of architecture knows that among the great diversity of solutions which every problem offers, no one is likely to think of all; and that hitting the most satisfactory one is very much a matter of good fortune as well as of skill. Yet in the cases which would naturally most frequently occur, of younger men being desired to consult with older, it would be perfectly reasonable for the junior to acknowledge that his more experienced senior was his superior, at least in the general estimation; but the superiority would be really established by their relative repute, not by the consultation. There is no reason to suppose that this idea of indignity would permanently attach itself to architectural consultation, any more than to medical, if it became an established custom.

The other obstacle is a more serious one, and would require that the principle of consultation should be carried out under some restriction. This is the fact that a piece of architecture is a work of art, and that unity is vital to it. The notion of some clients that they should be allowed to get projects from as many architects as they please, and, taking whatever features they please from each, work them up together, is utterly unreasonable. A work of art must first of all, in order to be good, be the consistent carrying out in every detail of a single general conception. Here it comes to architects to decide considerately in each case how and where consistency can be preserved in a common work, whether by fusing the ideas of both into a single conception, or by frankly surrendering the ideas of one for those of the other, or by confining themselves to distinct provinces in the work. When neither of these things can be done, it will be a good time for one to withdraw; in either case, it is desirable that the carrying out of the accepted scheme should be the work of a single mind. These considerations make difficulty, but experience shows that it can be overcome; and we are not arguing for consultations as the ordinary rule of practice. We propose them as the remedy in certain emergencies in which we are sure they would be found a valuable resource. The Albany Capitol will naturally suggest itself as an example where if we had been habituated to consultation in our profession, a great amount of difficulty and hard feeling might have been avoided.

As a matter of prescription there is no provision for or against such a practice in the customs of the profession, so far as we know. It is simply a blank page in our book of etiquette. There is no presumption against it except the presumption of habit, and the limitations with which it should be accepted. It belongs to architects to point the way in it as in other matters of practice. It would be better for those of them who find themselves in embarrassing difficulties, if they would invite it. The architect in possession when another is called in has always an advantage of position in that he has nothing to do but accept the situation frankly and with dignity; and it is better for both that the call should be made through him. A second architect called in by the client is by his position liable to appear as an interloper, to his own disadvantage and that of his fellow. On the other hand, the second has often a better chance to secure the right attitude in the client; it belongs to him to see that he does not divert any of the fees that are due his fellow, nor, if it can be avoided, diminish them. He ought to be willing that the work should remain under the nominal and if possible the real direction of the first architect, and should assure himself of his acquiescence and concert by personal conference; otherwise decency requires that he should refuse to have any thing to do with work with which another architect is engaged. The question of assignment of fees is a separate one upon which we will not venture here, only saying that clients should not be encouraged to court the services of more architects than one unless they consider them of more value than the services of one, and that in this case they ought to expect to pay more for them. These suggestions are perhaps only the A B C of courtesy; but since we know that the competition of business is the enemy of courtesy, and does its best to obscure it, there is no harm in mentioning them.

THE MINSTER OF AIX-LA-CHAPELLE, AND ITS RESTORATION.

WHEN we consider the absorbing interest with which the restoration of Cologne Cathedral has been watched, when we review the numberless discussions concerning it, it does not seem unnatural that the attention of the world has been withdrawn from the changes which have already affected and are about to affect its neighbor, the less pretentious but almost more important Minster of Aix-la-Chapelle. And yet the Cathedral of Cologne possesses little interest beyond its immensity; it is 'the noble conception of a mason,' has neither great historical importance nor architectural originality. But the patriotism of Germans, newly awakened, crops out even in books on purely scientific or artistic

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subjects, and prefers to review the national development of the thirteenth and fourteenth centuries at the expense of preceding and succeeding years. Perhaps this accounts for the late determined attempt of German *savants* to vindicate the Teutonic origin of the Gothic, and change its name to *German* style; an unsuccessful attempt, but one in which much ink was spilled. At all events, the glorious round-arch structures on the banks of the Rhine and Moselle have been long neglected, perhaps fortunately as far as concerns their renovation. It is only in Baden and the Palatinate that the influence of Hübsch has led to the restoration of the Cathedral of Spires, and the attempts, made with dubious success, to employ a quasi-Romanic style in the polytechnic and museum buildings, even in the theatre, of Carlsruhe.

Excepting the traces remaining at Trier (or Trêves), the oldest and one of the most interesting specimens of round-arch Rhenish architecture is the Minster of Aix-la-Chapelle, now by the addition of a façade and spire about to change its external appearance almost entirely. The minster as preserved to us, after having withstood the devastations of time and man[1] for over a thousand years, consists of distinct and different parts; a domed octagon dating back to A. D. 795–804, a Gothic choir built in the fourteenth century, and lateral chapels, ranging from those of the fifteenth century down to the latest and largest built in 1750, a gaudy mass of rococo gilding and stucco.

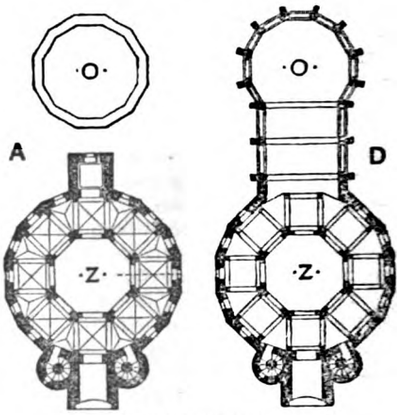
The octagon, Charlemagne's mausoleum, was crystallized, so to speak, within a noteworthy town, the favorite residence of the greatest man of his time. Some idea of the splendor of Aix-la-Chapelle, even five hundred years after the death of its benefactor, may be had from the letters written by Petrarca during his German travels. Charles the Great did not fail to appreciate the pomp and magnificence of the old Roman Empire, of which he believed himself the renewer, and of whose emperors he considered himself the successor. He thought it befitting to leave to his heirs truly imperial monuments. During the early years of his reign, though his presence was required on distant battle-fields, and his attention was taken up with organizing his Frankish empire, he was yet much impressed by the glory of Rome and Ravenna, those former capitals, and schemed to reproduce their fame in his favorite Northern city. He delighted to hear his poets sing of Aix as 'a second,' a growing Rome; his palace there, as well as those of Ingelheim and Nymegnen, was the admiration and wonder of contemporaries. The German peasant to-day tells how he built in Frankenland as many churches as there are letters in its alphabet, and that he presented each with a huge golden initial of great value. This saying, handed down from generation to generation, rather underrates than exaggerates their number, but is still a popular recognition of Charlemagne's munificence in such matters. In an old letter Charles proudly compares the ecclesiastical buildings of his empire with those of the Byzantines, telling how the latter suffered from lack of 'light and incense,' were poorly protected by defective roofs, while his chapels were decked with gold and silver, jewels and pearls. His polygon was the nucleus of the entire minster; it stood in connection with the palace, and was consecrated as the imperial chapel by Pope Leo the Third. From it the town took its name.[2]

A popular legend which is found under different forms in various places attaches itself to this church. The funds at the disposal of the builders gave out before its completion. The Devil agreed to complete the work according to the true intent of the original plans and specifications, on condition that the first living thing that crossed the threshold after the consecration should be his. But when the time came, a wolf was pushed through the portal by the astute clergy; and the Devil thus outwitted whisked him off in great rage. A statue of the wolf set up in commemoration of the event is still to be seen by the credulous traveller. The interior of the octagon, since the erection of the choir often improperly called the nave, remains to us in all constructive features as left by its builders. It is surrounded by galleries, and terminated by a dome nearly fifty feet in diameter, and over one hundred above the pavement.

The two galleries are vaulted as is seen by the plan A, and section E;[3] above them light is admitted to the central dome by windows. Regarding these galleries, Fergusson in his History of Architecture says:—

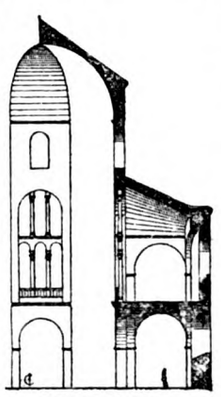
"The two lower, running over the side aisles, are covered with bold intersecting vaults. The third, like the triforium of more modern churches, is open to the roof; and above that are eight windows," etc. As may be seen from the section, there is no third gallery, nor is the upper one open to the roof. The mistake may have been caused by a superficial examination of the interior, which is, as he says, divided into four stories on the octagonal wall, the second and third of which correspond to the second gallery.

Lübke in his *Geschichte* speaks as blindly of the vaults of the upper gallery as "bisected barrel vaults," apparently misunderstanding their nature. As will be seen by the plans, the building is really a regular sixteen-sided figure, which encloses a regular octagon; and the separating aisle is divided into quadrilateral compartments which are covered in the lower gallery by the ordinary quadripartite vaulting, and triangular compartments which are covered by tripartite vaulting. In the second gallery a different method of vaulting is adopted; the quadrilateral spaces are covered by inclined barrel vaults, while the triangular spaces are covered by conoidal vaults, a method of vaulting, which, so far as we know, is only found in this building. To the east was the altar niche; to the west a tower, flanked by the two staircases usual at that time. It was through the tower that the chapel was connected with the imperial palace, all remains of which have disappeared for centuries. The original destination of the chapel as a tomb is clearly expressed by its circular disposition. The sepulchre was in the centre, as was always the case, at the spot marked Z on the plan. Otto III. opened it in 988, so giving Platen the theme of a song, and Kaulbach the subject of one of his well-known cartoons. The body was found seated in state on a throne, with globe and sceptre in hand; these insignia were removed, and have since been used at the coronation ceremonies of Roman emperors till within the memory of living men. The original minster has been spoken of by some writers as being but little more than a copy of San Vitale at Ravenna. The influence of this precedent was decided, it is true, but the polygon is far more than a mere copy. The plan of San Vitale is given at B[4] to show the general conformity of arrangement; the main difference is in the nature of the vaulting, both as regards design and material execution. Many churches of this period are of a similar disposition; as regards the plan alone, much likeness exists between the minster and the Duomo Vecchio at Brescia, as seen at C.[5] This latter church has a round dome larger than either that of San Vitale or the minster. It is anterior to the latter, having been built towards the close of the seventh century. Attention has never been called to this similarity, to the writer's knowledge. The design of the polygon, both as to composition and details, is rude and clumsy when compared with later forms; still it is vigorous and forcible throughout. The exterior walls of the second gallery, or solarium, have only about half the height of the arcade which opens from it into the octagon. Its stone barrel-vault, as may be seen from the section, is so in-



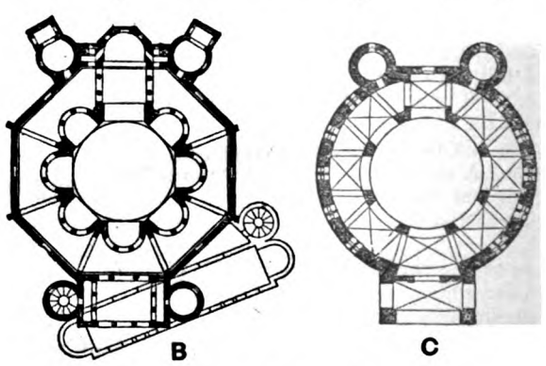
AIX-LA-CHAPELLE.

A.—The Imperial Chapel of Charlemagne.
D.—The Minster of the Fourteenth Century.



AIX-LA-CHAPELLE.

E.—Wall Section: Elevation of Side of Octagon.



Prototypes—Same Scale.

B.—RAVENNA: San Vitale. C.—BRESCIA: Duomo Vecchio.

[1] Like some other churches, the minster has at times been used by conquerors of the country as a stable; by the Normans first, who in the year 881 penetrated as far as Aix.

[2] Aix-la-Chapelle, the Gallic name of a German town, seems to be more generally in English use than Aachen. The real English name used by our forefathers is Aken, which is a nearer approach to the speech of the country and to the original Latin: *Aquis Granum* or *Aquæ Granæ*. This duality of city names is very confusing; how many forget that Trêves and Trier, Ratisbon and Regensburg, etc., are synonymous!

[3] From the essay of Mr. Mertens, published in *Förster's Bauzeitung*, 1840.

[4] From Reynaud.

[5] From Hübsch.

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clined as to steady the walls against the outward thrust of the dome; a dawning of new constructive principles in the North.

By the preparations made before the erection of the chapel, we see how enormous the undertaking was for that age. Materials and workmen were brought from every city of the empire where, during the previous century, architecture had comparatively flourished. The records of Aix-la-Chapelle speak of one Ansigis, an abbot of S. Vaudrille near Rouen, as the superintendent of the work. The name of the well-known Eginhard also occurs in this connection. Charlemagne apparently omitted nothing that could conduce to the success of his project. A letter is still extant in which Pope Hadrian almost ten years beforehand gave permission to the Frankish king and Roman patrician to remove various columns and marbles from the palace of Theodoric at Ravenna. He who in the North is revered as a founder, in the South is cursed as a plunderer.

These columns and the shafts which the imperial collector had scraped together from Rome, Trêves, and various places, naturally varied greatly in length and other dimensions, and when incorporated into the minster were pieced out as best might be with most dissimilar bases and capitals. As placed they are mere decorative features, standing under the upper arches of the octagon wall. How slight their function is, may be judged from the fact that they were once all stolen, and carried off to Paris by the French, who kept them there until a treaty of peace demanded their restitution. Eight of the original capitals never found their way back. As far as we can conceive, the interior of the polygon must have presented an exceedingly rich appearance shortly after its completion. Most splendid materials had been employed throughout; the exposed stone-work was of the costliest granite and marble; the doors and balustrades, fortunately still remaining, were of heavy bronze; and the wall surface was decorated with paintings on gold ground, after the manner of the Byzantines. For two hundred years after its dedication by Leo, no change was made in or about the building. At the end of that time Otto III. sharing in the belief so general in Europe, that the end of the world was at hand, made various pilgrimages to avert that evil, and, returning to his capital, opened the tomb of Charlemagne, as before mentioned. Impressed, no doubt, by the magnificence of the sepulchre, Otto desired a tomb-house similar to that of his predecessor, and near it. He therefore built a round chapel, as seen at O, in plan A, and arranged a receptacle for his bones in its centre. This was one of that great number of stone structures so diligently built by the inhabitants of our world when they found that it did not resolve into chaos in the year 1000, as they had confidently expected. Because of this fear, architecture had languished during the last decades of the tenth century; every thing had been flimsy and unsubstantial.

Of the form of Otto's chapel we can now judge only by analogy; all that remains of it is to be seen in the unusual formation of the Gothic choir as seen at D;[1] for when the two buildings were united in the fourteenth century, the architect of the choir retained the foundations of Otto's mausoleum, thus giving a peculiar form to the addition. At the time of the building of the choir, a spire was added to the tower, and the polygon began to be hidden by the additions. The choir itself is lank and restless in design, but is a characteristic specimen of the attenuated Gothic of that period of German architecture. It does not compare well with the polygon: the unity was impaired; but then it has remained unchanged in all save the roof, which was successively replaced after the fires of 1146, 1224, 1256, and 1656. The last of these fires (1656) was a disastrous conflagration which laid Aix-la-Chapelle in ashes; — in the town of 100,000 inhabitants over 4,000 buildings were destroyed. When it is considered that the houses were occupied, floor by floor, by the crowded population of a North German city in the seventeenth century, one sees how complete the sweep of the flames must have been. All the wood-work of the minster perished. The spire has not since been rebuilt; the choir was re-covered with the somewhat fantastic roof which still remains.

It was then that the dome was surrounded by an open gallery, and roofed with the eight gables which well express the nature of the interior while they add to the height and importance of the polygon. Its mass thus increased and shorn of the spire, its lost supremacy was in some degree regained. It is to be remarked that the precious interior was always protected from fire by the stone dome, its solid masonry withstanding the flames. This protection against the falling of blazing roof-timbers is, to the writer's mind, the fundamental idea and the true function of domes as well as vaults.

Since the building of the choir several side-chapels have been annexed, as before said. Already in the fifteenth century mention is made of five of these. They in their turn have crystallized around the octagon until but little of the original wall is to be seen.

There are many and valuable relics in the minster. The public exhibition of these, every seven years, attracts a great concourse of people from the surrounding country, sometimes over 70,000 at once. The chambers at present occupied by the relics have proved too small; and various interior renovations having been completed (as for instance the decoration of the inner dome with mosaics, and the restoration of the choir), it was recently judged best to rebuild the western façade and the spire in such a manner as to provide the requisite chambers for these relics, and allow a space to receive a chime of bells. To this end a competition was declared. After consideration of the submitted drawings by the appointed committee, the award was given to architect Schneider, a well-known German Gothicist. His plans were drawn after careful consultation of all existing representations of the western front and spire as they were before the fire. Having been approved and accepted, they were submitted to the custodian of antiquities, privy-councillor Dr. Von Quast.[2] His decision, unfavorable to the designs, is reported *in extenso* in a recent number of the *Deutsche Bauzeitung*, and is interesting, apart from its subject, as showing the careful attention given to the restoration of public buildings in Germany.

After expatiating upon the importance of the minster as a national monument dating from the very beginning of the empire, being the place of the coronation of German emperors for eight centuries, and its archæological interest as the only authentic work built by Charlemagne or during his time in Germany, Von Quast laments that the builders of the fourteenth and fifteenth centuries threw the original round-arch structure into the background. He regards the fire of 1656 almost as a fortunate event; explaining that, were the mediæval spire still in existence, he would carefully maintain it, but that he strenuously objects to rebuilding a spire as high as the one destroyed, or higher, considering that it, with its turrets and pinnacles, would disturb the effect of the composition in general, and of the polygon in particular. He maintains that the tower or spire of the building should be contented with a modest position and moderate development; that it might not interfere with the dome, the kernel and principal factor of the entire architectural composition. It seems to him not more admissible, that a Gothic spire should be added to the antique substructure.

It is true, he continues, the Gothic element is an important one in the mass, since the erection of the choir and the lateral chapels; yet for this very reason it would not be well to increase its predominance to the comparative obliteration of the original character of the building.

If a restoration be necessary, it should be considered a principle, that the tower walls should not rise much above the height of the present western façade, and that its roof or spire should not by modern and striking forms destroy the antique impression made by the whole. In consideration of these objections, very forcibly urged by Von Quast, the execution of Mr. Schneider's design was deferred. The drawings were returned to the society organized to take charge of the restoration (the *Karlsverein*), and again underwent a careful examination.

Earnest defenders were found in councillor Cremer and the canon of the minster, — Dr. Bock, — while the objections of the custodian were supported with equal warmth by Prof. Dr. Savelsberger and others. In a report thereupon presented by the *Karlsverein*, it is stated that though it is true that in restorations of architectural monuments, the original forms should be maintained and developed as far as possible, yet in this case it is not to be overlooked that the original form of the western front of the Carlovingian minster is entirely unknown, and that there is in existence no analogous building which might serve as a starting-point for the restorer.

It seems hardly possible that the additions could be carried out in the exact spirit of the constructors of the original polygon, and doubtful, were it feasible, that they would fulfil the demands of good taste while giving the space desired for the chambers, bell-deck, etc. To decide the matter definitely, the projects were submitted to a professional society of architects, who, after a technical inspection, voted unanimously in favor of the execution of Mr. Schneider's design. From their published decision, we learn that all the plans offered in competition agreed in so far as to add to the existing stone-work of the tower another story with galleries above. They all have similar connection with the octagon, and provide the required chambers by carrying up the staircase towers. The designs most essentially differ in the shapes of the spire. Schneider, as before said, has sought to reproduce the forms of the fourteenth century as far as is possible from the knowledge to be gleaned from the not over-exact representations remaining. In regard to the style, the architects call attention to the fact that the exterior of the polygon has been so entirely hidden by the additions, that it would be impossible ever again to bring it forward into predominance. Von Quast's suggestion was to build a low tower of square plan, upon the remaining walls, and that in place of the mediæval spire a low pyramidal roof should be superimposed. These forms, though not properly Carlovingian, would still harmonize with the original architecture; but, be the tower high or low, it will surely hide the octagon dome. Of course it can never be seen in elevation, and from the short distance allowed by the surrounding houses, the lowest tower would hide the dome roof from the west. At a greater distance buildings obscure the entire minster. Seen from whatever standpoint, the church does

[1] According to Mr. von Nolten

[2] This gentleman, whose recent death is an irreparable loss to archæology, is well known by various works and essays on architecture and kindred subjects.

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not present a unity of appearance, but is rather a picturesque group, the work of widely separated periods. The proportionately immense choir with its high roof is the most striking feature; and, as appears in the given cut, will be in a certain manner balanced by the aspiring tower on the west. Two minor alterations, advised by the society of architects, were adopted by Mr. Schneider. The roof of the gallery, namely, was planned to be of iron and glass, supported on iron columns. Dr. Von Quast had very correctly pointed this out as being not sufficiently monumental; and a trabeate construction of stone with stone columns was substituted, the openings not being thereby appreciably diminished. It was further recommended that the upper part of the tower, especially the turrets, should be more richly treated, that they might not appear unimportant in comparison with the florid form of the relic-chambers. With these slight changes, the minster of Aix-la-Chapelle will soon appear as represented in the cut. Of course the usual lack of funds is felt. The report of the *Karlsverein* budget shows assets only to the amount of 35,000 marks; but subscription lists are to be opened, and a substantial gift is expected from the emperor. The ministry of the interior has, in the mean time, been requested to reconcile the personal differences existing between the representatives of the varying opinions, and hopes are entertained that the success of this well-considered undertaking will be positive. J. T. C.

THE ILLUSTRATIONS.

THE MINSTER OF AIX-LA-CHAPELLE.

(See the above article on this subject.)

THE smaller of the two illustrations, which represents the minster with the proposed changes, is copied from the *Deutsche Bauzeitung;* the other illustration, which represents the minster in its present condition, is taken from the *Monuments d'Architecture, de Sculpture, et de Peinture de l'Allemagne*, a French translation of a German work published by Ernest Förster.

FIRE-PROOF CONSTRUCTION FOR GRAIN-ELEVATORS. DESIGNED BY MESSRS. POULSON AND EGER.

See the communication upon this subject in this number.

STORE ON CHESTNUT STREET, PHILADELPHIA, PENN. MR. JAMES P. SIMS, ARCHITECT.

The materials of which this store is built are red brick with finish of Ohio stone. Courses of enamelled brick have been used in the decoration. The oriel window is intended for the display of millinery.

THE COLLECTIONS OF M. THIERS.

THE catholicity which was M. Thiers' most striking characteristic also characterizes his collection. But, despite his eclecticism, he seems to have had a certain predilection for sculpture. At the door of his cabinet are two antiques reduced in marble, the Apollo Sauroctonus, and the Satyr of Praxiteles, executed by Mercié. On pedestals at right and left of the Last Judgment, over the chimney-piece of the main hall, the Farnese Hercules and Michael Angelo's Slave are stationed, as if the master of the house had wished to establish a comparison between ancient and modern genius. In the fulness of his pronounced and swelling muscles, the Hercules is in some sort the work of a Greek Michael Angelo, but it is expressive only of strength in repose. The Slave makes manifest beauty in affliction. A divine feeling characterizes the statue of Glycon; Michael Angelo's has a living soul, and by thus infusing sentiment into marble the Florentine artist has risen to the highest eminence. M. Thiers was passionately fond of the works of Michael Angelo; he admired above all the sculptures of the tombs of the Medici. For a long time he had possessed these in bronze; but these bronzes, having perished during the horrors of the civil war, were replaced in marble, at half-size, by M. Maniglier, an old *pensionnaire*, one of our best sculptors, and, moreover, a master of the chisel. At either extremity of the cabinet are to be seen those four stately and melancholy figures, — Day and Night, Morning and Evening, beautiful and formidable in their austere elegance, eternally chafing upon these mausoleums as if the asperities of life, persistent even in death, still stirred, in the recesses of the tomb, the heroes who are there immured.

A treasure highly prized by M. Thiers is the bronze copy of Michael Angelo's unfinished Madonna, placed in this same chapel of the Medici between the two tombs. Were it seen but for an instant, it would be impossible to forget this lofty Virgin, whose head and attitude express a sombre melancholy as she despondently suckles her child. Michael Angelo gave the clay sketch of his Virgin to Jean Salviati, Bishop of Florence, and it was kept for three centuries in the Salviati family, which became extinct towards 1830. "That bronze," we once said to M. Thiers, "is worth ten times its weight in gold; in view of the public admiration, it should be expropriated, and transferred to the Louvre." The distinguished amateur answered by a gesture which seemed to imply that this disposition might one day be effected.

The bronzes of M. Thiers are almost all of the Renaissance, and are all of exceptional beauty. Among them are to be found the precious antique Mime from the Denon collection, an equestrian statue, modelled possibly by Leonardo da Vinci, a bust full of life and simplicity by Lorenzo Ghiberti, a Florentine Venus, a charming little satyr scratching his leg and holding a goat's horn, an antique bust of Anacreon, a boy with a serpent, a boy with a goose, and the marine Venus, in high relief, which made such an impression upon amateurs when it appeared at the sale of Monville. This is a Venus Anadyomena, carelessly reclining upon a sea-monster, half goat, half fish, whom she ensnares with her hair, and whom her grace has vanquished. A number of other valuable bronzes are kept in glass cases, or exposed upon a book-case of convenient height. Here, too, is the charming bronze of the Mercury of Rude, a work worthy of the greatest masters. Finally, upon a high pedestal in the middle of the cabinet, stands the equestrian statue of Colleoni, which, by permission, was executed for M. Thiers upon the spot, in Venice, and in which all the accentuations, the niceties, and the spirit of the original bronze are kept to perfection.

In the ante-room of the cabinet, facing the spectator, stands the bronze statue of Benvenuto Cellini's Perseus, magnificent in pose although slightly affected. This statue was made in Florence by M. Maniglier to replace a first copy which had perished in the fire of the Tuileries. As we were telling M. Thiers one day that he had a decided taste for the Renaissance, he interrupted us quickly, calling our attention to the Apollo Sauroctonus and the flute-playing satyr: "There," said he, "is the standard of the beautiful; it should always be within reach. . . . Be assured, I have not ventured upon this sea of the many varieties of human art, without knowing the safe places where I can cast anchor." — *L'Art Français.*

CORRESPONDENCE.

NEW CHURCH. — THE INSANE HOSPITAL COMPETITION.

PHILADELPHIA.

THE peculiar church edifice lately finished by Mr. Hewitt for the Second Reformed Episcopal congregation, at the south-east corner of Chestnut and Aspen Streets, is a decidedly new departure in the way of ecclesiastical architecture. The frontage on Chestnut Street is 84 feet, and a depth of 140 feet on the west brings the building within a few feet of the schoolhouse which fronts on Sansom Street. The base course throughout is of Pennsylvania blue marble; the entire front, tower, and window heads and bands of the flank are of Ohio sandstone; and the side wall of red pressed brick. The front is divided into three portions; at one corner a tower, and at the other corner a dwarfed tower which impinges upon the adjoining houses; the wall between these terminates in a low flat pediment, which is finished out without any moulding, its only ornament being a triangular mass of foliated decoration in relief. On the ground floor in each of these three divisions is a broad square-headed entrance door, the central one being set back within a sort of portico formed by two pairs of twin columns which are fluted for half their height and have a very severe Ionic style of capital. Above this portico is a large broad window under a low segmental arch, the only arch, indeed almost the only curved line, which appears in the composition. The tower is 25 feet square, and 120 feet high in four stages; the lower portion very simple, and the pilasters of the upper portion being so arranged that there appears to be no fall back to the walls; the upper stage is left quite open, two columns similar to those of the front portico being introduced on each side to support the lintel. The cornice which is very flat, or very little more than a reeded moulding, is surmounted by a foliated battlement in galvanized iron painted of the same tint as the sandstone. A similar finish surmounts the dwarfed tower, the latter having on the summit of a low pyramidal roof a large vase or cresset-shaped ornament. The Aspen-street flank is treated as if it were a two-story building. The massive stone window-lintels are so cut as to lend additional height to the windows. Above the upper windows is a line of large panels of brick-work, and the wall is finished out in a moulded galvanized-iron cornice, while the central mass of the flank is run up into a low flat pediment. All the lines of the design are very simple, and with so little moulding or ornament that a general suggestion of perpendicularity and squareness is thrust upon the eye. The auditorium, which is 68 feet by 95 feet, is, with the semicircular gallery, furnished with seats arranged in the amphitheatral manner, radiating from the centre of one of the long sides where a broad recess forms a sort of shallow tribune, in the midst of which is placed the pulpit. The interior finish is in walnut and ash, with slabs of colored marble as bases for the pilasters and as a dado in the rear of the pulpit. The organ, which is by Roosevelt, is situated on the main floor to the right of the pulpit.

The Public Building Commission met on the last day of the past month: but beyond passing a few bills, — the most important probably that of Struthers and Sons for marble, $27,102, — no business of interest was transacted.

The committee on buildings of the Insane Hospital Commission, after nearly two months' consideration of the submitted designs,

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have selected as the five to whom the prizes of $500 each are to be awarded, Messrs. Sloan, Wilson Brothers, Hutton & Ord, and J. F. Stuckert, of this city, and Messrs. Perry & Sedgwick of New York. As the drawings have not yet been placed on exhibition as it was proposed they should be, they still remain a sealed book to all outside of the Commission. On Wednesday the Committee held a meeting, after which they called in each of the five selected architects in turn for a half-hour's examination. Some of them have also been requested to modify their designs in some of the detail, and to procure additional bids.

One of the best designs which have lately come out of Messrs. Hutton and Ord's office is that of a dwelling-house which is being built on the south-west corner of Twenty-second and Walnut Streets. It is three stories in height, built of red brick with courses of black brick, the base-course and cornice with the window-sills being of bluish-gray stone. It is very plain in general style, but the machicolated cornice gives it a somewhat Italian Ghibelline character. The entrance porch in the centre of the Twenty-second Street front forms a vestibule quite outside of the house, and leaves clear the fine hall which is to be lighted by a skylight.

The theatre on Chestnut Street, between Tenth and Eleventh, which was destroyed by fire last February, was finished the first of this month. There are but two galleries instead of the three which it formerly had, and another stairway is provided for exit from these to the street in the rear.

DRYING PLASTERING IN DENMARK.

THE drying process of Mr. Kruse of Copenhagen, which was described in the *American Architect* for Sept. 15, was, it appears, incorrectly reported in one respect by the Hessian journal referred to as authority. Mr. Kruse makes the following correction. The building was dried story by story, each requiring eight days, not three as before given. He considers any astonishment that the statement of time made by the *Gewerbeblatt* may have caused, as very natural. Any attempt to dry plastering in three days by his method would prove futile, as the temperature named (ninety-five to one hundred and twenty-five degrees Fahrenheit) cannot well be obtained in so short a time, for the cold damp masonry absorbs an immense amount of heat. The process is described at length, in a paper read before the *Congrès d'Hygiène et de Sauvetage* of Brussels.

The building in question is five stories high, and was built in the fall and winter of 1872. The walls, it was calculated, contained water to the amount of five per cent of their mass. The process of drying this quantity was correctly reported in our former article; it was only the length of time required that was mis-stated. To that report it may be added that the chimneys were closed above the roof by means of slates laid upon the flues and heaped over with sand. The escape of the smoke and gases was through the windows, which were provided with air-boxes opening at the level of the floor. The inspection of the rooms during the firing was only possible for a few instants at a time, and then but with great caution. "I sought," says Mr. Kruse, "to forego breathing, and closed mouth and nose with a handkerchief." On the second day the walls exhibited curious blue and green spots, probably caused by a microscopic vegetable growth; these disappeared with increased heat and dryness; the plaster at last became so hard as to emit sparks when rasped with the blade of a knife. The cost of this rapid desiccation was 900 francs ($180). The process has since been employed with comparatively less expense, a saving being effected by using a second set of chimney-flues for the exit of the smoke, instead of window air-boxes. Mr. Kruse himself recommends that if possible his method should be used before the introduction of windows, doors, and other wood-work, especially before the laying of parquetry floors.

FIRE-PROOF GRAIN-ELEVATORS.

BROOKLYN, N.Y.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

The building which is represented in the accompanying illustrations is constructed as follows: First, cast-iron columns are placed as shown in the plan, and from them spring cast-iron groined arches, lined on the inside with cement or brick, so as to prevent the contact of grain with the iron. Above the arches are built brick walls or bins, hexagonal in form; cast-iron bond plates are used to give additional strength to the bins. The outside walls are arched inwards, so as to resist the outward pressure. The roof and machinery are built as usual.

The advantage of constructing a building as here proposed is its small cost in comparison with the fire-proof grain-elevators previously built. The first great saving is in the lower part, by the omission of beams, girders, and floor; for the load is carried directly by the arches and columns, without first being carried by beams and by them transferred to girders, and from the girders to columns, which is nothing less than supporting the same load three times; and this horizontal support by beams and girders is very costly. As here proposed, the load is only supported once, the groined arches doing a double duty as supports of the building and bin-bottoms, and thereby saving space and material. The construction of the lower part is very simple, as it only requires three patterns for making the lower part of the building. The arches are cast complete, with holes for bolts, so that no fitting or drilling is required. The lower part will not cost more than a wood construction, with post, girders, floor, and bin-bottoms, while it has the advantage of being fire-proof.

In the upper part the bins are built in hexagonal form, as it is by far the most economical form, where only strength, capacity, and economy have to be considered. The difference of capacity of square, hexagonal, and circular bins, using the same number of square feet of materials for each, calculating for supporting grain on both sides of partition, is as follows, using 48 feet of materials in each case: 48 feet will make a hexagon, sides 8 feet long, interior capacity 158 square feet 4 inches, exterior capacity 158 square feet 4 inches, equals 316 square feet 8 inches; square, sides 12 feet long, interior capacity 144 square feet, exterior capacity 144 square feet, equals 288 square feet; circular, 15 feet 4 inches diameter, interior capacity 185 square feet, exterior capacity 50 square feet, equals 235 square feet. Thus showing, that as far as capacity is concerned, the hexagon is by far the best form of bin; and as for strength the hexagonal form is very much superior to the square, as the sides in the square bin are 12 feet long to the 8-feet-long sides in the hexagon, and will require to be made twice as strong as the 8-feet sides in the hexagon, and thereby using more materials, more space, and reducing capacity; and as the sole object of the building is capacity, this is quite an item. It takes more square feet of material to fill a given space with square than with hexagonal bins, gives less capacity, and requires twice the strength of materials for the square, on account of the difference of length of sides of bins.

One advantage of building a fire-proof elevator is very great: it will require no insurance on building or grain. Another advantage is the fact that such a building will outlast many wooden buildings; and as it is generally considered that a wooden grain-elevator after it has been built for twenty years, has cost as much in repairs as its first cost, while the old building then left is not of much value, — whereas the fire-proof building in the same time will have cost very little in repair, and is as good as when first built, — this is no mean advantage. Another advantage of a building built as here proposed is, that it is strictly rat-proof, as there are no places for them to hide in.

A building constructed as here proposed will not cost much if any more than a wooden building; and compared with the fire-proof grain-elevators in Brooklyn and Philadelphia, built with columns, girders, beams, iron floor, and circular wrought-iron bins, it would not cost nearly half so much.

Very truly yours,

POULSON AND EGER.

SELF-MADE ARCHITECTS.

CAMBRIDGE, ILL., Nov. 1, 1877.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — I have read with deep interest your articles on the subject of the technological education of architects.

I have vainly hoped that some one might be prompted to champion that class of architects who owe none of their unquestioned ability and skill to any school of technology, but solely to natural ability and persistent private study. Nothing has been said in this one-sided controversy of that class of architects who have regularly graduated at some excellent institution, and also spent three or four years in Europe, and are not now competent to design a finial, as many of our public buildings will prove.

Would you drive the poor out of the profession, and close your doors against them? Should you not rather extend the helping hand to struggling merit, and by pointing out a judicious course of study to those who are not able to pursue any other, lift them to that position which nature designed them to occupy?

A knowledge of the sciences upon which architecture rests is certainly indispensable, but it does not follow that such knowledge may only be gained in college. Indeed, the fundamental principles of true architecture may not all be learned, but must to some extent be a natural gift (see Ruskin). The sciences are taught; the practical is only acquired by experience; but the *art* is a gift of Heaven, without which no man may hope to become an architect of eminence.

Are all the blunders committed, and bad designs made, by this "ignorant" class? or are they not, as a rule, the work of graduates?

In short, the indications are that we have too much scientific, and too little practical, knowledge of architecture.

Western people believe that, in architecture as in other professions, there is no "royal road" to excellence; but that the ranks that produced a Lincoln, a Douglas, and many others whom the country delights to honor, have the materials, and can produce men of all professions second to none, even though not trained up by any technological institute. Please let us hear from the "self-made."

Yours, W.

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NOTES AND CLIPPINGS.

LESSONS IN OFFICE WORK. — A course of lessons in office work and specifications for architectural draughtsmen, forming one of the free Lowell courses at the Institute of Technology at Boston, began this week. There were about forty young men in attendance. It is proposed, at the successive meetings of the class upon Wednesday evenings, to distribute copies of a form of specification which is now in use in the architectural classes at the Institute, asking those of the class who are attached to offices, and are willing to do a little hard work, to bring in at the succeeding lesson such additional material as they can glean from an examination of the various specifications to which they have access. The first topics to be taken up will be Excavation, Piling, and Foundations; and the pages relating to each topic will be ready at the lesson for which it is assigned. A comparison of these notes and their final reduction to a serviceable shape can hardly fail, it would seem, to be of value, especially to the young men who bear the brunt of the labor. The class were asked to collect, during the present week, such information as they could in regard to the conduct of office work, so far at least as relates to methods of keeping office records, whether in manuscript or by printed forms. Attention was specially directed to time-books, showing how the draughtsmen's work is apportioned, to the management of payments, and to the recording of the state of works in progress and the issue of drawings. The lesson closed with an account of the method of estimating by squaring used in France and Germany, which the class were invited to apply, by way of example, to any building, the items of whose cost were accessible to them, and to further illustrate the subject by bringing in an account of any other short-hand ways of estimating they might find to be in use by architects or by contractors. A dozen or twenty students offered to take part in these researches.

TYPHOID FEVER. — The recent prevalence of typhoid fever in Rochester, N.Y., is proved by scientific analysis to be due to impure well-water. Professor Lattimore, of Rochester University, has tested water from wells on forty different streets, and finds that surface drainage and bad sewers have made the average of impure salts per gallon 16.78 grains, an amount three or four times that which is compatible with health. He doubts if there is a well of pure water in the city.

STATE-HOUSE APPROPRIATION. — The following address was issued by the Committees on Public Buildings and Grounds of the Senate and House of Representatives of the Thirtieth General Assembly of Illinois, prior to their adjournment: —

To the People of the State of Illinois, — During the session of your General Assembly now closing its labors, it has been the duty of the undersigned, members of the Committees on Public Buildings and Grounds of the Senate and House of Representatives, to give part of their time and attention to the public buildings of the State, and among others to the new State House.

The new State House, as you are advised, has been occupied for more than a year past by the public officers of the State, and by the General Assembly during the present session; but it is unfinished; and the amount of money limited by the Constitution for its erection, without a direct appeal to the votes of the people, has already been expended on the building.

The present Legislature, after very maturely considering all the circumstances thus far attending its erection and its present condition, has, by decisive majorities, submitted a law for your approval, appropriating the further sum of $531,712.18 for the finishing and furnishing the building, and grading and fencing the grounds.

Much as the public may differ as to the taste or elegance of its interior finish or ornamentation, and much as practical men may disagree as to the judgment of the commissioners and architects in the details of its construction, there can be no difference in the opinion that all the money appropriated for the purpose has been spent in and about its erection, and that none has been unlawfully used. All concur in the opinion that the building is admirably adapted to the purposes for which it was erected, with room enough for the use of the State for generations to come, convenient in all its arrangements and appointments, well lighted, well heated, well ventilated, and stable and endurable. But portions of the interior and its porticos remain unfinished and exposed to the weather and to risk of injury. The grounds are unkept, unguarded, and unfenced; and the premises cannot be kept safe from intrusion. We think the building and grounds should not so remain; and therefore we recommend, by your votes at the next November election, the sanction of the appropriation submitted.

William Lindsey, W. L. Chambers, S. H. Busy, E. C. Bartholow, T. T. Fountain, William A. James, George B. Gray, W. E. Morrison, J. J. Kearney, D. W. Smith, John E. Dewey, F. E. Albright, Committee of the House.

Miles P. Castle, Thomas P. Bonfield, E. Southworth, J. S. Lee, B. Arntzen, M. W. Robinson, W. E. Shutt, Committee of the Senate.

THE INSPECTOR OF BUILDINGS, BOSTON. — The nomination of Mr. John S. Damrell for the office of inspector of buildings took the public by surprise, and the more it is considered the more its propriety is questioned. He has never held a prominent position as a builder, and no one will question that the office should be filled by either an engineer, an architect, or a builder of large experience. That Mr. Damrell possesses these qualifications does not appear; and in view of the strong petition of the architects and builders against his appointment, it is reasonable to suppose that the council will reconsider its action and reject it. — *Boston Advertiser.*

GOVERNMENT BUILDING IN NEW YORK. — The Supervising Architect, Mr. Hill, in his annual report, asks for no appropriation for building in New York City, the amount of money on hand being sufficient to finish the government work now in progress there.

A GOOD PRECEDENT. — The committee of the City Council, charged with the furnishing of the new City Hall, at Providence, R.I., have formally engaged Mr. S. J. F. Thayer, the architect of the building, to design the furniture, etc., and advise in the selection of carpets, fabrics, and other fittings for the building, — an example which we should like to see followed in the case of other public buildings.

A SOLDIERS' MONUMENT. — A monument, which is to cost $4,285, is to be erected at Memphis, in memory of the soldiers of the Confederate armies who died during the war of the Rebellion.

THE TRADE-MARK TREATY. — The trade-mark treaty between the United States and Great Britian, which was signed by United States Minister Pierrepont and the Earl of Derby, Secretary of State for the Foreign Department, some days since, provides that the subjects or citizens of each country shall have the same rights as the subjects or citizens of the other, or as are now or may hereafter be granted to the subjects or citizens of the most favored nation in every thing relating to trade-marks and trade-labels, upon fulfilling the formalities required by the laws of the respective countries. The London Committee on Trade-marks invites American manufacturers to communicate with E. Johnson, secretary, 3 Castle St., Holborn, London, in regard to any grievances they may have connected therewith.

THE PUBLIC LANDS. — The Commissioner of the General Land Office in his annual report recommends amongst other things that Congress withdraw all lands chiefly valuable for pine timber from the operation of the homestead and pre-emption laws and from sale except for cash; also that the Secretary of the Interior be authorized to sell timber from public lands in the mining districts; also to sell timber upon any unsurveyed land not mineral, when needed for actual settlement, before public surveys; also, that a law be enacted providing for the care and custody of timber lands unfit for agriculture, and for the gradual sale of timber, and for the perpetuation of the growth of the timber of such lands. Legislation authorizing the seizure of timber cut from public lands without resort to the tedious process of the courts, is also recommended.

BURNING OF A PITTSBURGH, PENN., THEATRE. — Trimble's Varieties Theatre, on Pennsylvania Avenue near Sixth Street, was nearly destroyed by fire on the morning of Nov. 10.

A MUNIFICENT BEQUEST. — Mr. Allen C. Lewis of Chicago left a will, which, after various bequests to charitable societies and individuals, places the residue of his estate, which is estimated to be worth at least $500,000 after allowing for shrinkage, in trust, to be invested in good paying securities or real estate, and held until 1885, or until such time as $800,000 can be realized out of the trust estate, when the trustees shall erect a building in Chicago, to cost not over $250,000, to be known as the Lewis Institute, in which shall be established a free library, also a night-school for the free instruction of pupils in special branches or studies, such as telegraphy and other scientific instruction. A lecture-room is also to be built, and a course of free lectures maintained, devoted to arts, sciences, etc., or public readings. Also a free reading-room with all late standard newspapers, magazines, and a library furnished with scientific works, avoiding novels and all sensational literature. Also a school for teaching females in such branches of art, science, designs, etc., as may be deemed best to enable them to gain a livelihood from such teaching. And also, as soon as the estate admits of it, to establish and maintain a thorough polytechnic school. This school is to be established in the most thorough and sysematic manner, with a first-class corps of teachers, so as to make it one of the leading schools of the country. Scholars are to be admitted, first from the city, then the State, and lastly, if there are opportunities, from the country at large, and all free.

THE PITTSBURG GLASS BUSINESS. — Up to the year 1873 Pittsburg had a monopoly of the manufacture of glass in the United States. In that year came the panic; and the prices being too high to continue with profit, the manufacturers decided to cut the wages of their workmen down and reduce the prices. A strike resulted, and every glass-furnace in Pittsburg and the vicinity was closed, throwing thousands of men out of employment. As the deadlock continued a new field was occupied. Glass factories sprang up at various points in the West, chiefly conducted by unemployed workmen, upon the co-operative plan, many of these have since passed into the hands of men of wealth. Gradually but surely as the number of these has increased, occupying the field, and gaining the trade, the business has lost its prestige in Pittsburg. A little improvement was manifested in the manufacture of window-glass; but last spring another strike resulted in the suspension of all the houses in that line. The strikers accomplished nothing; but the business has gradually improved since that time, a number of new furnaces having been put in operation, at which operatives were glad to accept work.

THE BROOKLYN BRIDGE. — The opposition of certain persons to the completion of the East River Bridge has been again brought to public attention by a report of a special committee to the Council of Political Reform, in which the old objections are once more enumerated. It is reported that counsel in the suit of E. B. Miller against the Bridge Company are confident that the United States courts will pronounce in their favor.

THE LONDON OPERA HOUSE. — The *Standard* says the debenture holders of the new National Opera House on the Thames Embankment have determined that the project is a failure, and will convert the site into a hotel, or use it for some similar purpose.

CEMENT. — A bed of natural cement has been discovered at Turner's Falls, Mass.

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VIEW SHOWING THE PRESENT CONDITION.

VIEW SHOWING THE PROPOSED RESTORATION.

THE MINSTER OF AIX-LA-CHAPELLE.

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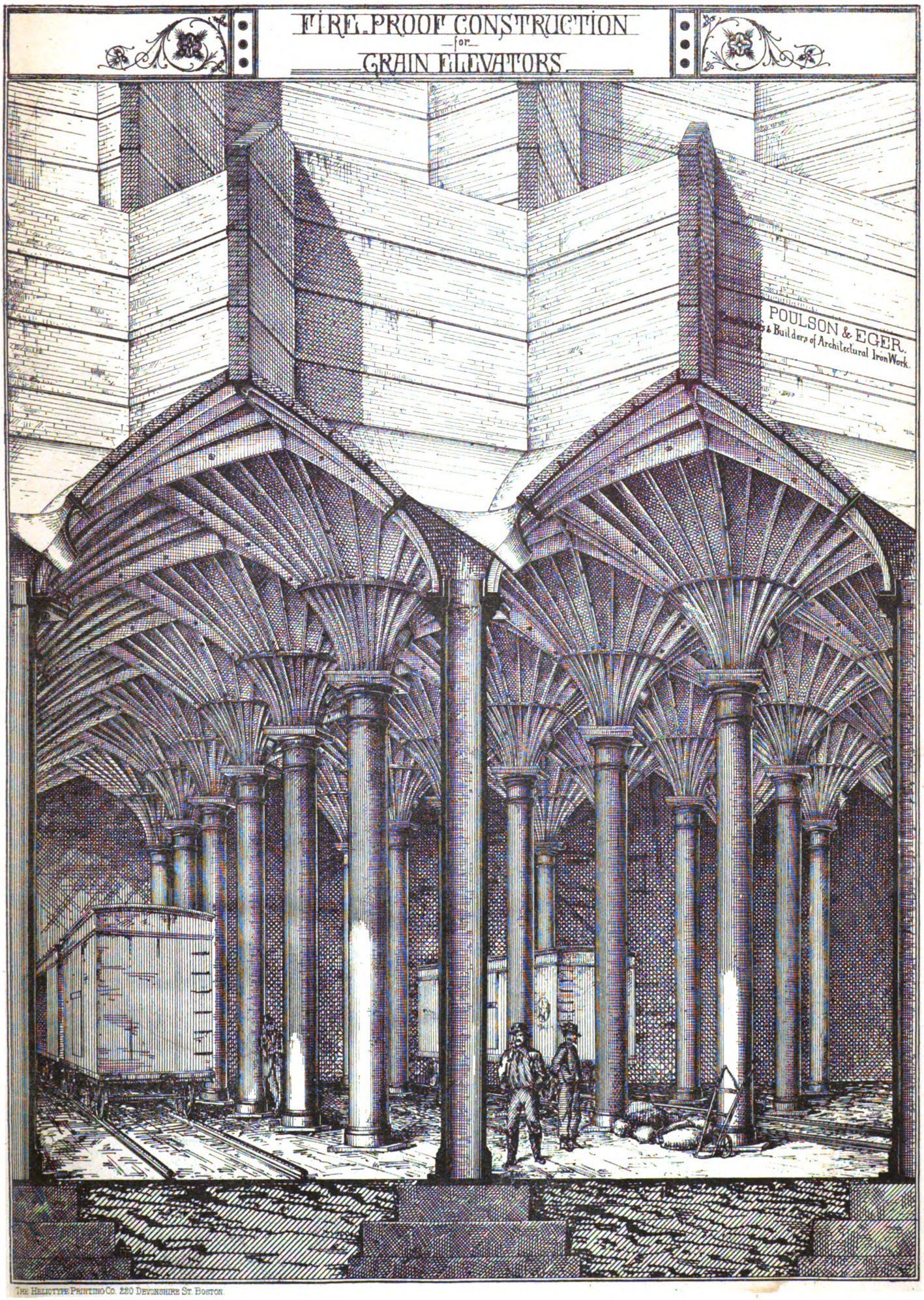

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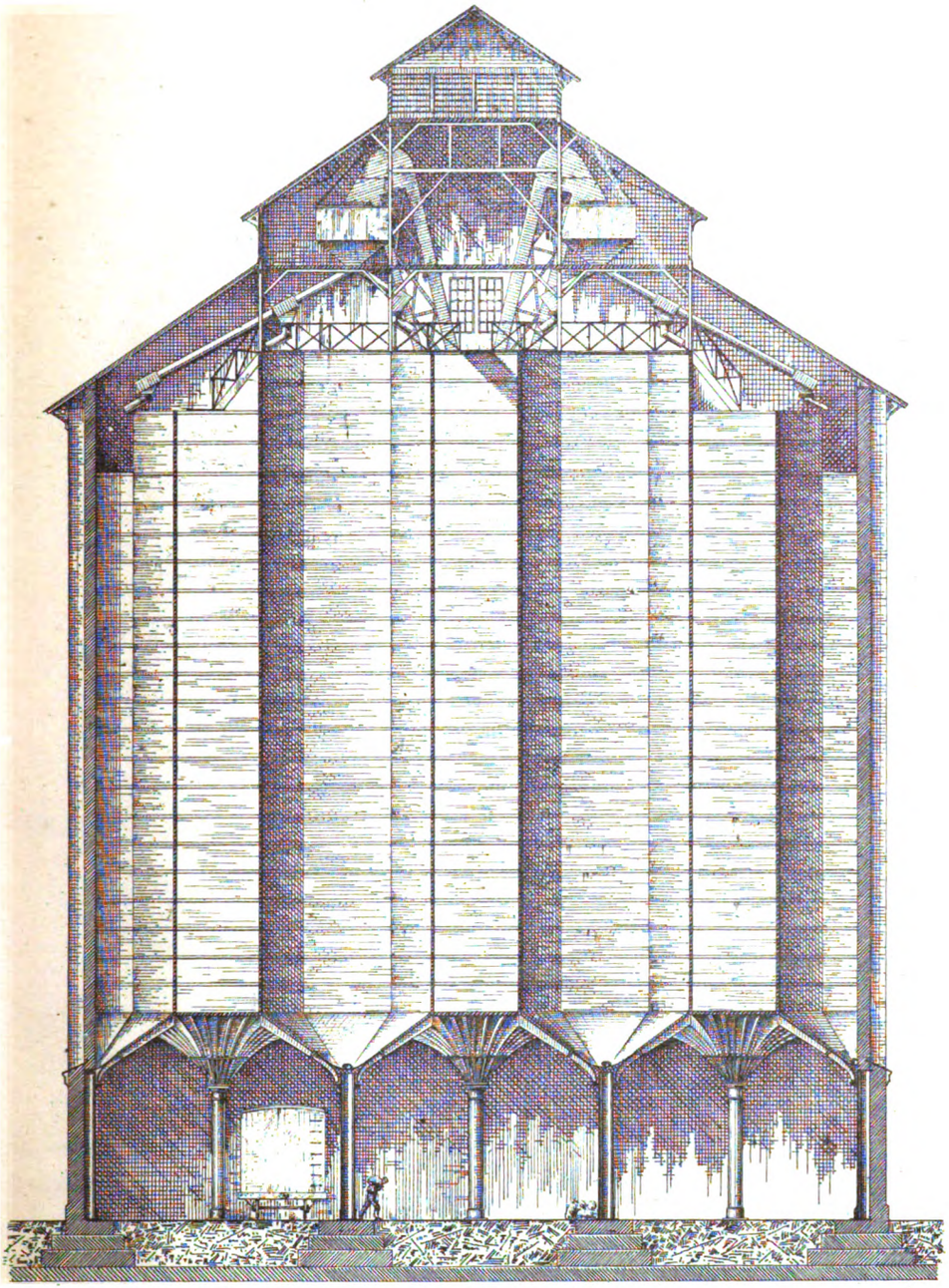

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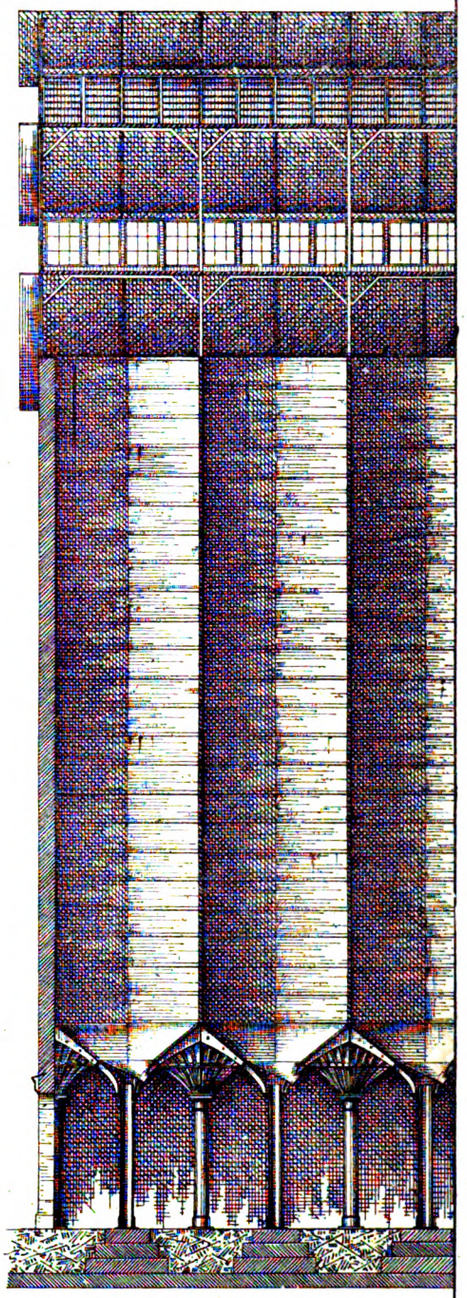

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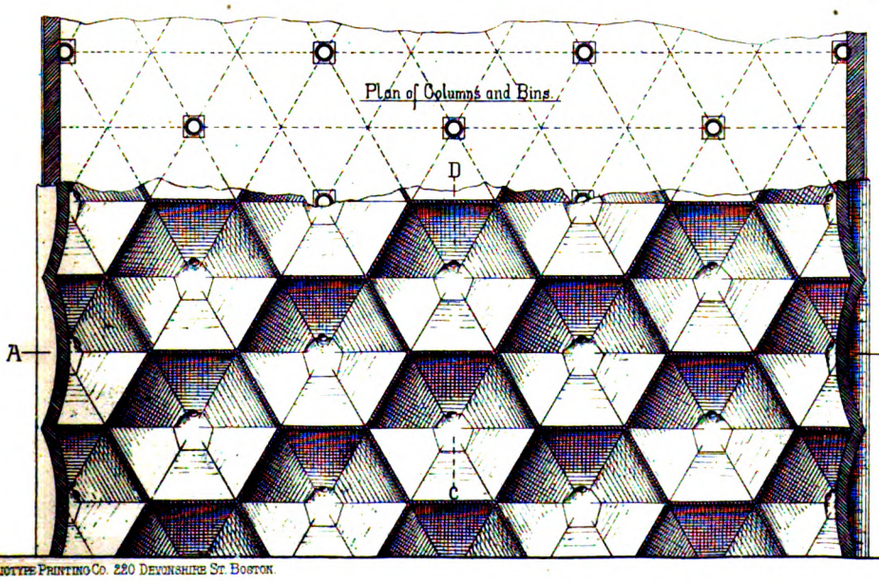

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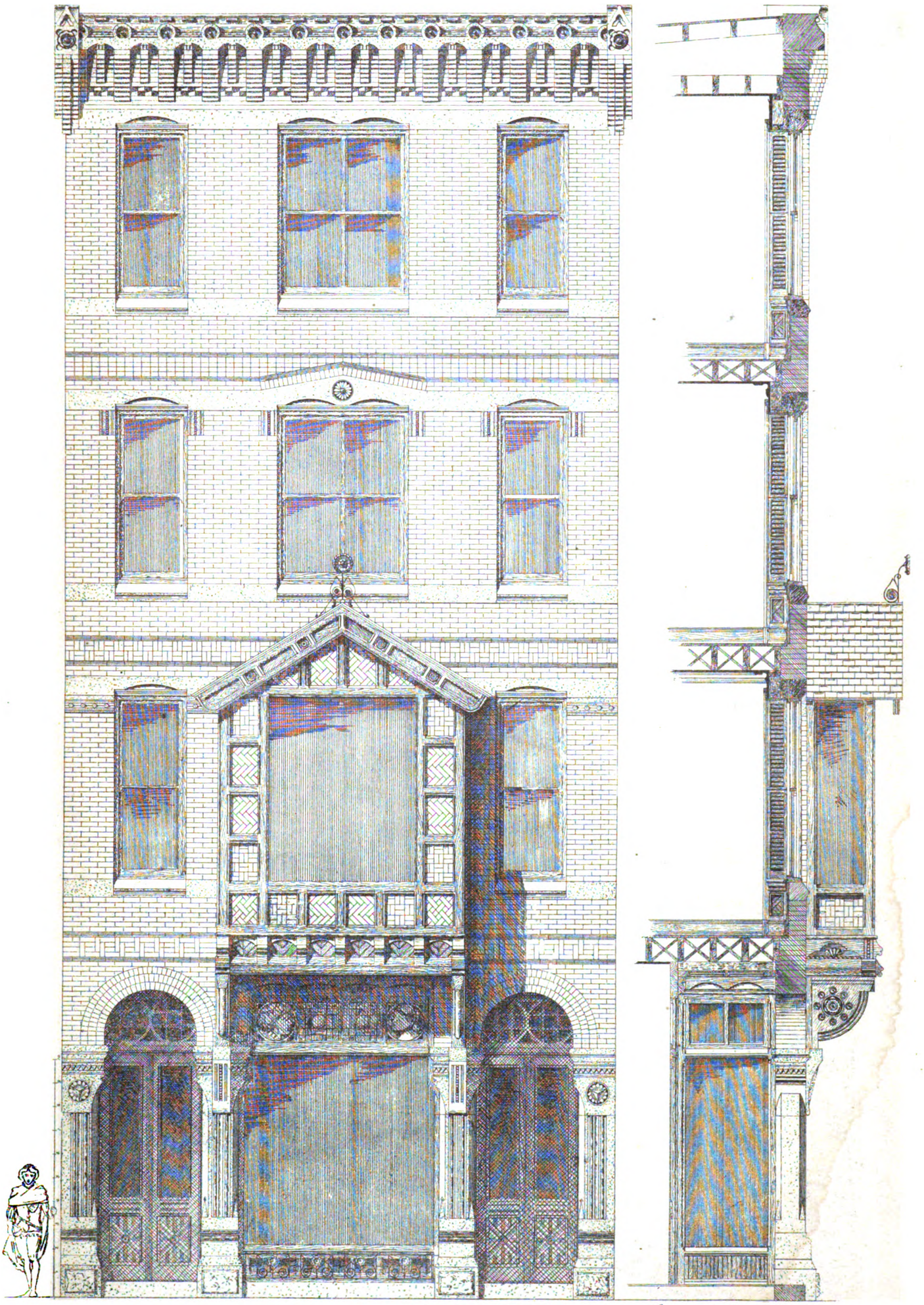

STORE ON CHESTNUT STREET PHILADELPHIA.

James P. Sims
Architect

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, NOVEMBER 24, 1877.

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IT is perhaps unsafe to say that the subservience of public trust to private or political ends is more iniquitous in one office than in another; but at least it may be said that officers whose duty is neither clerical, nor strictly executive or ministerial, nor constrained by the safeguard of any routine, ought to be especially trustworthy. Those who have to exercise a repressive authority in cases which affect the immediate safety of the public, and who need to do it with great firmness, decision, judgment, and impartiality, most of all if their duties require special knowledge of an unusual kind, need to be selected with especial care, to be above suspicion either of incompetence or of unfaithfulness, and ought to be put out of reach at least of ordinary temptations to favoritism and dishonesty. There are few positions to which these considerations apply with more force than to that of an Inspector of Buildings in a large city; few in which there is a greater opportunity for slackness, corruption, or favor, or in which the consequences of these or of incompetence are likely to be more disastrous. New York is a city that has not been favored in its inspectors, we believe, and the *Times* has lately been giving some rather miserable pictures of the management of their chief, the Superintendent of Buildings. The work of the department is done by some eighty inspectors, who decide on their own responsibility what application shall be made of the building-laws of New York. A fixed allowance of $75,000 is made for the expenses of the Department, so that any increase of expenditure in any one direction has to be met by cutting down in others. At the time of the appointment of the present incumbent, says the *Times*, his salary was $4,000, and the inspectors' $1,800 each. Before long, it continues, he contrived to have his own salary increased by sixty per cent, to accomplish which those of the inspectors were cut down to $1,500 each. This was soon followed by the levying of a tax of fifteen or twenty dollars on each of them at irregular intervals; a new reduction of pay to $1,200 followed, and these same assessments from time to time, alternating with other reductions, till in 1876 most of the inspectors received only from seven hundred and fifty to a thousand dollars. There is no account of a further increase of salary to the Superintendent; but the assessments accrued, says the *Times*, when he had notes to pay, or had occasion to make a journey to Albany on legislative business, the inspectors not daring to resist or complain for fear of losing their places, which were at the disposal of the Superintendent. Under these circumstances the inspectors are ready, it is charged, to eke out salaries on which they cannot support their families, and are always open to bribery; and the consequence is that violations of the building-laws are everywhere connived at, to the demoralization of the Department of Buildings, and the constant danger of the public.

MEANWHILE in Boston the old chief inspector of buildings has been replaced under circumstances that have been very distasteful to a good part of the community. Some time ago, when there was question of his removal on what seemed to be purely political grounds, an earnest remonstrance was signed by most of the architects of the city, and by the principal builders, and at that time the change was not made. Soon after came the fall of the staging at the dedication of the Soldiers' Monument; and his responsibility for that has been assigned as the reason why he is now replaced. It does not become those who believe in the necessity of enforcing strict responsibility in such an important office to complain of this piece of discipline, if it is only borne out by such rigor in the future control of the inspectorship, as shall show that it was inflicted in good faith. We have not heard, however, of any thing being done to the sub-inspectors to whom the direct responsibility of inspecting the stand which fell had been deputed. The new inspector has been appointed in face of strong opposition, and against an earnest remonstrance from many architects and builders. He is neither architect nor engineer, nor a builder of reputation; and there is no reason to suppose that he has any thing more than an ordinary contractor's knowledge of building. He has experience in the management of fires, for he was chief engineer of the fire department in Boston for some years, up to the time of the great fire of 1872; but complaint was made that his chief strength lay in the management of city politics, and after the experience of the fire it was thought necessary to re-organize the fire department, putting it in the hands of special commissioners; and the former chief engineer disappeared from view. Under these circumstances, the presumption against the new inspector is strong, and lays on him an unusual obligation to justify his appointment. The requirements of such a position have changed much of late. An ordinary knowledge of building will not meet them; nor will an easy-going routine performance of duties. The inspector is constantly called on to face difficult questions with knowledge and decision; to enforce his authority against embarrassing opposition and many temptations. The public demand for accountability grows with the importance of the position. A man who owes his place to a severe enforcement of such accountability upon his predecessor, has need to show by his administration a fitness for it that cannot be gainsaid; and the authority that has appointed him against a common distrust, has given large hostages to the public.

THE public at all events are not left to forget the need of inspectors or the importance of their duties. The burning of the great warehouse of Field, Leiter, & Co. in Chicago, last week, by which half a dozen firemen were killed and several more badly hurt, is another warning. In this case the building was so high that water could not be thrown upon the roof, where the fire took; and the flames made their way down through the large central well and among the wooden flues so fast that the burning staircase fell upon the men. The roof, which was a wooden mansard, had taken fire once before, and had been put out with great difficulty—the fire each time beginning within the furring over the attic ceiling, where it was very difficult to get at. There is a touch of what some persons would call the "irony of fate" in the burning of Candee's rubber-factory at New Haven, where the fire-officers were actually inspecting the extinguishing apparatus at the moment when the fire broke out, and were very nearly burned up with it. As we write it is still uncertain whether any of the work-people were burned, though it is said that some were injured. But for the fact that five hundred out of eight hundred girls had just been discharged for want of work, the disaster might have been greater, for the fire, as in the Chicago building, spread with wonderful quickness.

AT the time we write there seems no doubt that the Paris Exhibition bill will go through Congress substantially as we reported it in our last number. In the text of the bill as passed by the House, we find no trace of the unexplained special provision for the re-exhibited goods which we then doubted, and we are glad to know that the Indian corn amendment which was at one time attached to it will not be tained. It has been replaced by some very foolish amendments whose object is to share the commissioners alike among the States, balancing New York and Pennsylvania against Florida and Texas, for instance, without regard to the number

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of specially qualified men they may have to offer, and so probably depriving the country of much valuable service. It seems a thing to be regretted, that the appropriation asked for by the Secretary of State is considerably reduced. As he well said, "The meagre contribution which we furnished to the Vienna Exposition can furnish no safe measure of the greatly increased transportation we shall need to meet the wishes and expectations of our people in the representation of their interests at the French Exposition." Economical administration of the government is very praiseworthy, and just now very opportune; but if judicious economy, as is commonly understood, consists in knowing just where to save and where to spend, it consists in distinguishing what should be cut off altogether and what needs to be done well if at all. Among these last things we should include an important undertaking which we share with foreign nations.

A SCHEME of internal improvement which was devised some forty years ago is likely to be pressed upon Congress this winter, says the *Philadelphia Press*. It is a scheme for a land-locked water communication along and near the Atlantic coast from Florida to New York. The chain of salt water reaches and sounds, which stretches almost uninterruptedly along the coast of North and South Carolina and Georgia, has always suggested tempting prospects of an easy coastwise traffic, sheltered from the gales that make a terror of the neighboring Atlantic in this region; but the shallowness of much of the water, and the interposition here and there of stretches of open coast, have made such a route unsafe for inland craft and impracticable for sea-going vessels. There is already in use, however, a continuous water-route, for steam-barges and the like, from New York to Pamlico Sound. Boats enter the Raritan River from New York Bay, and pass through the Delaware and Raritan Canal to the Delaware River, which they follow to the head of its bay, then crossing by the Delaware and Chesapeake Canal to the head of Chesapeake Bay, descending its whole length to Norfolk. Thence the Chesapeake and Albemarle Canal, taking in part of Currituck Sound, brings them into Albemarle and Pamlico Sounds, and so by the Neuse River to Newbern. Now it is proposed to ask the Government to extend the route as far as Wilmington, by a canal between the Neuse and Cape Fear Rivers, and to deepen the channels from Norfolk till they will admit vessels of ten feet draft. A survey for a canal to Cape Fear River was made two years ago by Col. Abert of the United States Engineers, and reported to Congress last winter. Two estimates were submitted, — one for a canal at the sea-level at a cost of something over seven and a half millions of dollars, the other for a summit-level canal with six locks, at a cost of about four millions. This project derives its importance, as Col. Abert said in his report, "from being part of a general scheme for uniting the sounds which extend from Fernandina, Fla. (with but few interruptions), to North Carolina, and complete the connection by means of the intervening lakes with the northern lakes and the St. Lawrence River." He adds that the construction of the Cape Fear Canal, which is less than sixty miles, and of two sections south of it about a hundred miles in joint length, will make a continuous communication by canal, sound, and river from the St. Lawrence to Fernandina. That such a line of communication would prove in the long run a great convenience to coastwise trade can hardly be doubted, when we consider the dangers of the outside route; and if our coast-defence in time of war is to consist in monitors, torpedoes, and other unseaworthy machines, it might become of great military importance. Of its immediate urgency we cannot judge; but it is hardly to be expected that a House of Representatives which is bent upon cutting down the army should look with favor upon it for military reasons.

A CORRESPONDENT sends us a letter which we print on another page, complaining, and with reason, of the common neglect of bonding in American brick-work. It is clear enough that our fashion of building brick walls in vertical slices of four inches thick, held together by little else than the layers of mortar between them, is a very insecure one. Even the pretence of bonding by headers in every fifth course is more honored in the breach than the observance, especially when the work is meant to be handsome; and the facing of a wall is commonly held to the backing only by withes of hoop-iron or something of the sort, or by mere adhesion. The reason is plain. It is to get a sleek surface by the use of a quality of brick and workmanship which is not to be carried through. This is the case both with good masons and bad. The first often, from a notion that the characteristics of handsome brick-work are a sleek face and thin joints, wish to lay the outside with smooth face-brick that will not bond with the backing because of difference in size, and which it would be an unreasonable expense to carry through the wall. It is nothing unusual, in fact, where a brick building is under alteration, to see the whole facing skinned off, leaving the rest of the wall undisturbed, to be replaced by one more ornate. There is of course no greater objection to this kind of construction than there is to building a veneering of thin stone without bonding it into the wall, provided the wall itself is given its due thickness and bond independently of the facing. But though this is provided for in the case of stone veneering in some of our building-laws, we remember none in which the brick facing of a brick wall is counted out in estimating its thickness. The tendency is, in order to save trouble, to build the backing in the same disconnected way, and make a wall that can be split into slices from top to bottom. In the hands of a scamping builder this makes as bad brick-work as one can conceive. Though the difference in scale between face brick and common brick is one of the greatest drawbacks to a good system of bonding, it is one that could readily be removed. With it conspires the rage for thin joints, which are quite incompatible with thorough bonding, except with bricks that exactly match, and in the most laborious manner. And yet thin joints are not necessary to nice workmanship. We say nothing of Roman brick-work, which was meant to last and not to show; but the wide joints of a handsome piece of French or German brick-work would to a good American bricklayer be a stumbling-block, and yet the foreign work is in no wise inferior in mechanical beauty to ours. So long as there was nothing in our brick masonry but its joints wherein its workmanship could be shown, it was natural to like to make them as close as possible. Now that ornamental brick-work, with colors and moulded forms, is coming into vogue, our workmen will find other ways of showing their skill, and can afford to forgive a wider joint if it is a good one. The most insidious foe — and we fear the most obstinate one — to a solider way of bonding is likely to be the desire for cheap work.

THE CHURCH ARCHITECTURE THAT WE NEED.[1] — I.

THE necessity which man experiences to address the superhuman has induced all races to erect shrines and temples to the Infinite. Religious architecture, therefore, is the first to develop itself, and it may be safely asserted that the human race has lavished more time and treasure upon the erection of religious edifices than upon any other class of structures. In the religious monuments of antiquity, particularly, we find embodied the spirit of past ages, and in order more clearly to arrive at our present requirements, it may be meet to first glance at the church architecture of the past. The early Christians who, until the fourth century, were condemned to worship God in secret places, were first enabled to celebrate their religious rites openly after the conversion of the Emperor Constantine to the Christian faith. The pagan temple with its cella, where only the priesthood and the initiated were allowed to penetrate, was ill-suited to the requirements of the followers of Christ, who were called upon to take part in the worship of God, and on that account, if for no other reason, was discarded by them. The spacious basilica, on the other hand (where justice was administered, and which served also as an exchange and place of public meeting), was well adapted to their wants, and was naturally adopted by them, and has since served very generally, with certain modifications, as the typical church throughout Western Europe up to the present day.

Vestiges only of the Pagan basilicas of Rome have been handed down to us; but sufficient data exist to form some idea of the grandeur and magnificence of two of the most important ones of that imperial city, namely, that of Trajan and that of Maxentius, respectively 180 feet and 195 feet wide, and proportionately long. The interior space of the former was subdivided by four rows of columns into five avenues. The central one or *nave*, 87 feet wide and about 120 feet high, was covered by a semi-circular wooden roof, apparently covered with plates of bronze and richly decorated. Galleries extended above the side aisles, the columns of which supported the roof, and the interior was lighted by windows

[1] A paper read at the Fourth Church Congress held at New York from Oct. 30 to Nov. 2, by Mr. Richard M. Hunt, F.A.I.A.

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in the side walls. In the Basilica of Maxentius, commonly known as the Temple of Peace, four piers of masonry separated the main nave from the side aisles. The nave, 83 feet wide and 120 feet high, was covered by groined arches; the side aisles, each subdivided into three compartments, were covered by barrel vaults of 72 feet span, running at right angles to the main aisle, the crown of the side vaults rising to about the level of the spring of the middle vault, thus allowing space above for large window openings which lighted the upper and central portion; other windows in the side walls lighted the aisles. This latter system of construction, for many reasons, was not followed by the early Christians, but was revived during the Middle Ages. For centuries the cheaper and more easily constructed basilica, with its wooden roof supported on columns abundantly furnished by the pagan monuments, was the type adhered to; and great solidity and economy were thereby obtained. Ten centuries of existence is the proof of their solidity; and economy was gained by the lightness of the construction generally, no vaulting being introduced necessitating heavy supports, the apse alone being vaulted.

The architectural details of the most ancient Christian basilicas furnish conclusive evidence that they were erected for the express service of that faith; and on account of their great similarity in plain and detail to their pagan prototypes. the appellation *basilica*, signifying "Royal House," was naturally retained, and it is even probable that the arrangement of the structure influenced to some extent the usages adopted by the early Christians. The early Christian basilica was rectangular in plan, about twice its width in height, and generally subdivided interiorly into three aisles by two rows of columns running lengthwise of the building. The middle aisle or nave was about double the side aisles in width and height, and was covered by a double pitched wooden roof, either ceiled in below or showing apparent timber work, the aisles being covered by lean-to roofs. The interior was amply lighted by circular-headed windows, both in the outer walls of the aisles and in the upper portion of the nave, — the clere-story. In more important churches the side aisles were doubled; galleries were also introduced at times above them. The main entrance was located in the middle of one end of the building, with minor entrances on either side. An atrium for the assemblages of the penitents (recalling the ancient forum) usually preceded the entrance, in the centre of which stood a fountain where the faithful sprinkled themselves in token of inner purification. Later the narthex or porch replaced the atrium, and the basin of holy water placed inside the building near the entrance was substituted for the fountain. At the end opposite to the entrance was the apse, corresponding to the tribune of the ancients, semi-circular in form, and raised a few steps above the general level, while in the middle of the apse, instead of the seat of the chief magistrate, the bishop's throne was placed with seats for the inferior clergy on either side. In front stood the altar, with a canopy supported on four columns (the ciborium), which could be closed by curtains; and originally the priest, when officiating at the altar, faced the congregation. In order to separate the clergy from the laity, the apse was at first railed in; later, more room being required for their accommodation, a space in front of the apse was likewise enclosed — styled the bema or presbytery; and still later the choir, with the ambo or pulpit, where the Gospels and Epistles were read and services performed by the inferior orders of the clergy, occupied a portion of the nave, adjoining and in front of the bema. The enclosure of the choir was kept low in order that the congregation might witness the ceremonies performed in the raised presbytery.

The architectural treatment of the early Christian basilicas was simple and severe. Exteriorly, no attempt at architectural effect was made except in the treatment of the principal façade, the crowning feature of which was its coved cornice, with stucco and painted decoration or mosaic work. The sides of the building presented bare walls, pierced with round-headed windows and crowned by a cornice. The interior, with its rows of polished granite or marble shafts, offered a grand opportunity for producing a truly magnificent effect; and in spite of the incongruous mixture of fragments taken from heathen buildings, the effect produced was imposing and solemn. Simplicity and repose reigned throughout, and the great wall spaces, decorated with frescos representing sacred subjects, which were treated in a broad and dignified manner, gave to the interior an air of solemnity which the rich mosaic decorations (generally on a gold ground) of the apse and about the grand opening of the nave into the sanctuary, styled the Triumphal Arch, greatly enhanced. And to this day the Roman basilica, with its nave 80 feet in width (about double that of most Gothic cathedrals), stands unrivalled for great breadth of effect indicative of stability and power. The absence of a vaulted ceiling (necessitated by the great width) renders it perhaps less monumental than the cathedral; still its unbroken colonnades, leading to the triumphal arch and the apse beyond, concentrate the interest about the altar to a much greater degree than where the principal feature occurs at the crossing near the middle of the nave.

St. Paul's, outside the walls of Rome (rebuilt in 1822), is very similar to the original basilica of St. Peter's, erected by Constantine, both in arrangement and dimension, and in its majestic splendor furnishes a good example of the five-aisled basilicas; while the magnificent interior of Santa Maria Maggiore offers a most beautiful example of the three-aisled basilica, with its noble colonnades supporting the clere-story and panelled ceiling above. San Clemente, however, erected in the fourth and fifth centuries and rebuilt in the tenth, is by far the most interesting, as being in many respects the most complete example now extant of this early type.

In order more clearly to appreciate the changes occurring in church architecture, it is necessary to consider another type coeval with the basilica, which was destined (through Eastern influences) to develop into a new style, — the Byzantine; which influenced very appreciably the Romanesque architecture — that derived from the Roman — of Western Europe. In the earliest days of Christianity, the circular church was quite as common as the basilica (rectangular in plan), especially where a building of moderate dimensions was needed. During the eleventh and twelfth centuries, however (when so many churches were rebuilt and enlarged), the circular form was superseded almost entirely by the basilica, the latter being better adapted to the extended requirements of Christianity. The basilica became the "ecclesia," or place of assembly, of the early Christians. Matters of importance, civil and religious, transpired within its walls. The circular building was used for the celebration of the more sacred rites of the church, and usually stood by itself near the west end of the basilica. Originally (like its Roman prototype) it contained the tomb of some important personage; and from the fact that the rite of baptism was there administered, it was called the "baptistery."

The early Christian circular buildings were generally covered by wooden roofs, and the interior subdivided by one or more concentric rows of columns forming circular aisles. The central portion (like the nave of the basilica) rising above the aisles was lighted by clere-story windows. Among other examples of this type are San Stephano Rotondo and the Baptistery of Constantine. In the tombs of St. Helena and those that stood in the spina of the Circus of Nero, the wooden roof is replaced by the dome (first applied by the ancient Romans in structures of importance). It is more than probable that the basilica was the type of the Christian churches erected in Byzantium by Constantine (322); but this type was soon abandoned, as under Justinian, two centuries later, the Church of St, Sophia (originally erected by Constantine) having been destroyed by fire, was rebuilt on a totally different plan, and offers to-day, with its pendentive dome resting on four corner piers, the grandest specimen of Byzantine architecture. With the introduction of this novel feature, *the pendentive* (which consists in filling the voids in the angles occurring between the square and the inscribed circle with spherical triangles of masonry), the problem which had puzzled the architectural mind for centuries, namely, the satisfactory combination of the circular dome with a square substructure, was solved, and most important was the result. Among other interesting examples illustrating the various stages of this combination of the dome with the octagon and the square, may be cited St. Vitale at Ravenna, which served as a model to the tomb of Charlemagne at Aix-la-Chapelle; San Lorenzo at Milan, the cathedral church of that city down to the eighth century; Sta. Fosca at Torcello, Venice; and the Church of Sergius and Bacchus, known as the lesser St. Sophia, in Constantinople.

A few words are necessary in explanation of the vast importance of this new feature, the pendentive. The dome of the ancient Romans resting on a drum was truly grand in its simplicity. That glorious example, the Pantheon at Rome, 144 feet in diameter and height, uniquely lighted at the top, rivals in sublimity of interior effect any thing since accomplished in Western Europe. Exteriorly, however, great difficulties presented themselves whenever any attempt was made to combine the circular form harmoniously with any adjunct or addition; and besides, with the increased size of the building (the interior being practically confined to the space occupied by the dome), the weight and thrust of the latter were increased, and difficulties of construction arose. By the employment of pendentives (the dome being supported at four points only), the difficulties previously encountered in extending the building beyond the dome disappeared.

Eastern Europe abounds in examples of this striking feature introduced in an endless variety of ways, securing advantages of plan, and which are universally graceful in outline. The Church of St. Sophia, so often reproduced in the mosques of Constantinople and the East, offers an interior which for beauty and appropriate design and sublimity of effect stands unrivalled. This church is nearly square in plan, it being 220 feet wide by 243 feet in length. The central dome, 107 feet in diameter and 182 feet high, rests on four semi-circular arches. Supported on corner piers abutting against these arches on two sides are semi-domes, around which are clustered other smaller ones. On the two remaining sides the arches are filled in by a wall pierced by three tiers of windows, below which are galleries two stories in height, which extend around the entire church excepting at the apse. The galleries are well lighted by side windows. At the end opposite the apse there is also a large window directly lighting the middle portion of the church, in addition to which a girdle of windows is introduced at the base of the domes, which diffuse a mysterious light, making the domes appear as if they were suspended from on high, and increasing the effect of the rich mosaics

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(with their gold background) lining the domes and covering the upper portions of the walls, in perfect harmony with the variegated marbles which embellish the walls below.

Another type of the Byzantine church (and one with which we are all familiar) is that of St. Mark's in Venice, 164 feet by 205 feet. The ground-plan is in the form of a Greek cross. Five equal-sized domes, resting on arches extending back to the walls, surmount the arms and the crossing. Rows of columns between the supporting piers which separate the nave from the aisles are here introduced, probably to increase the apparent height of the nave, as there are no galleries above the aisles. The interior is profusely decorated with marbles and mosaics in the same manner as, though far inferior to that of St. Sophia, and justly commands our admiration. A great variety of marbles are also used in the interior decoration. Originally the roof covering was laid directly on the extrados of the domes, as at St. Sophia and throughout the East; the canopies which now surmount them being erected in the fourteenth century.

St. Front, at Perigueux, France (erected on the site of a Roman basilica), is almost an exact repetition in form and dimension of St. Mark's. Instead, however, of the semi-circular arches and domes used at St. Mark's, we find the pointed arch and dome, which were probably employed to diminish the thrust, — a fact worthy of remark, as at that time, in the tenth century, the pointed arch had not yet been adopted in France. Later, during the eleventh and twelfth centuries, numerous examples occur in various parts of France, where the pendentive dome is introduced in churches, both with and without transepts. Before returning, however, to the church architecture of Western Europe, it may be well to note some of the characteristics of the Byzantine style.

With the introduction of the pendentive dome, a vast unencumbered space was obtained, without the great height which the vaulted ceilings of the Gothic and Romanesque styles necessitated. The great breadth of effect of the vast wall surfaces, richly decorated with mosaics and marbles, was increased by the skilful treatment of the details throughout; the smaller parts contrasting with the larger, so as to increase the apparent size of the structure, or, in professional parlance, the "scale" of the building was augmented, which method was employed later by the Gothic architects with much effect, and which was diametrically opposed to that followed in the classic school, where the proportion of the orders or *ensemble* governed the details in every part.

Already in the eighth century, during the reign of Charlemagne, the Romanesque churches bore the stamp of oriental influences, especially along the Rhine, the Mediterranean coast, and in the Pyrenees. Through these influences, and various others, many modifications were introduced from time to time in the basilica, which still remained the chief type of church architecture in the West of Europe. Among other changes are to be noted the introduction of additional chapels beside the apse; the total omission of the apse (the last end having a rectangular termination); the introduction of a second apse, with choir at the west end, together with a second transept at times; the continuation of the aisles around the choir and apse, with or without chapels — an important feature admirably worked out later, especially by the French in their chevets, where the lower portion of the wall of the apse is replaced by columns, producing a wonderful effect in perspective, and which originated in the attempts made to join on to the east end of the nave, a circular building containing the tomb or relic of some saint, the gradual development of which is to be traced in the plan of St. Benigne at Dijon, destroyed during the French Revolution, in the Church of Charroux, on the Loire; that of St. Martin at Tours, and those of Conques and Toulouse.

Quite as important as these interior modifications, were the changes introduced in the exterior façades. The side walls were subdivided into compartments by pilastered buttresses and engaged columns. Small arches were introduced in the cornices, and galleries of arches on columns around the apse; varied and beautiful polychromatic effects were also obtained by the use of different colored materials. Columns were also used at the sides of the doors and windows, the latter being now grouped together. The western façade especially assumed great importance, with its two towers and central gable, or horizontal front, or with its central tower.

Towers were also introduced to flank the façades of the transepts, which were carried to the same height as the nave; and at the crossing the lantern tower was introduced, thus accentuating in elevation the form of the cross in plan. The most important change, however, resulted from the substitution of the vault for the wooden ceiling (which, previous to the tenth century, was only used over the choir and apse). This change originated probably in the desire to protect the structure from the dangers of the elements, as in the earlier examples the roof covering of stone, lead, or metal, was laid not unfrequently directly on the extrados of the vault; but on account of dampness and for other causes, this method had to be abandoned, and a wooden roof with slate, tiles, or metal, constructed as a protection to the masonry. The circular church at Nocera dei Pagani, between Rome and Naples, offers the earliest instance known of covering the vault of a building with a wooden roof.

The varied attempts at vaulting the nave were but partially successful, however, on account of the great difficulties experienced in overcoming the thrust of the old Roman barrel vault then employed, it being accomplished by the construction of semi-vaults over the aisles, and by leaving out the clerestory. Later, buttresses were introduced with groined arches, but it was not until the Roman system of vault-building was superseded by the Gothic system in the twelfth and thirteenth centuries, that this important problem was solved satisfactorily.

THE ILLUSTRATIONS.

THE CATHEDRAL AT WORMS.

ONE of the oldest as well as most instructive of the German churches is the cathedral at Worms, built in the Romanesque style. It was begun in 996 upon the site of a much earlier church, and was consecrated in 1016, or according to other authorities, in 1110. As will be seen by examining the plan, this is one of the buildings in which the form of the Latin cross is most strongly marked. Like the cathedral at Spires, which was built at about the same time, but which has retained more of the Roman basilica in its appearance, for most of the German and French churches were then modelled on the plan of the Roman basilicas, this building is remarkable in its four towers (two at either end) and two domes. The cathedral at Spires, however, has entrances at the west end as well as on the sides, whereas this building can be entered on the sides only, — a peculiarity of arrangement which it shares with a number of the more important German churches, as for instance the cathedrals at Bamberg, Mainz (Mayence), Augsberg, and Trier (Treves), the abbey church at Laach, a church at Hildesheim and St. Sebald at Nürnberg. This arrangement allows of a sort of secondary choir at the west end, which is here terminated by an octagonal apse. This portion of the building is of later date than the rest, for here are found pointed arches, and may possibly have been built in 1300 at the same time with the south portal. The north-west tower was built in 1472, to replace one that had fallen. The building measures on the inside about three hundred and fifty-seven feet in length by eighty-seven in width. Engaged columns on the inner sides of the alternate piers of the nave receive the ribs of the vaulting, while every pier has an engaged column on the side towards the aisles. The air of dignified simplicity which is the characteristic of the interior is broken at the choir at the east end, which in the eighteenth century was decorated with marbles and gilding. The illustration is reproduced from Dollinger's *Architectonische Reise-Scizzen*, published at Stuttgart by Konrad Wittwer.

INTERIORS OF THE COUNCIL-CHAMBER AND MAYOR'S CHAMBER IN THE CITY HALL, PROVIDENCE, R.I. MR. S. J. F. THAYER, ARCHITECT.

The plans of this building, together with a view of the central hall and staircase, were published in our number for March 25, 1876.

HOUSE OF W. H. HUNTINGTON, ESQ., CLEVELAND, O. MR. F. S. BARNUM, ARCHITECT.

This house is very substantially built, and for one of its class and cost very complete in its appointments. The hall or reception-room forming an important feature of the interior has stairs entirely of hard wood, as also an open fire-place faced with tiles, with tile hearth, and a high mantel in one angle as shown on the plan. The projecting window on the stairway has a transom filled with stained cathedral glass. The exterior is painted a pale green, with trimmings in olive green; the roof covered with red tiles. The cost complete is $4,500; this includes electric bells and burglar-alarm throughout.

HOUSE OF H. D. LLOYD, ESQ., CHICAGO, ILL. MESSRS. BURNHAM AND ROOT, ARCHITECTS.

This house, which was built in 1875, is of Philadelphia brick with wrought work of Lemont stone. The interior finish is of yellow pine oiled and shellacked. The ceilings are of timber and plaster.

VILLA NEAR PHILADELPHIA, PENN. MR. T. RONEY WILLIAMSON, ARCHITECT.

This drawing represents a small half-timber house at Angora, near Philadelphia. The first story is of Philadelphia brick laid in black mortar. The second story is a timber frame with the panels filled with plaster.

A NOTABLE ARCHITECTURAL JOURNEY.

IN our notice of Dr. Freeman's Historical and Architectural Sketches (vol. ii., p. 19), we had occasion to state that he is the only English writer of general history who has given due weight to the testimony of architecture. Approaching this art from the historical side, and bringing to the subject an intelligent appreciation of the significance of form, especially as regards the growth of distinctive styles, the recurrence of especial features in buildings far apart from each other, and the characteristic variations

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in certain details attributable to the unconscious influence of race and usage, he has been enabled not only to illustrate and enforce well-known historical facts, but by processes of deduction entirely new to historians, to show more clearly than heretofore, the mutual relations of countries, and the essential genius which underlies and induces the character of various civilizations. Probably also from architectural remains, the science of ethnology will ultimately obtain its most satisfactory testimony, and its most abundant and significant illustrations. Any attempt therefore to describe or analyze an ancient or contemporary architecture, if the examination goes below the external features of it, and explains how it developed or is developing out of the necessity of things, how it is an outgrowth, and, in a manner, an expression of religions, politics, and habits of life, is a contribution, not to architecture alone, nor to archæology; but to that greater science which addresses itself to the study of man, as a creature of intelligence and progress. Such attempts are unusual enough to make the architectural journey of M. Félix Narjoux in the north-west of Europe, as set forth in his "*Notes and Sketches*,"[1] worthy of special consideration.

Certain descriptive passages from this book, which we quoted in these pages in the early part of the year, with their illustrations, may have served to give some idea of the style of this author, both with pen and pencil, and to recall that of his friend and master M. Viollet-le-Duc. His journey extended over a part of Europe comparatively little travelled by foreigners. He sketched in Holland at Dordrecht, Rotterdam, the Hague, Scheveningen, Leyden, Haarlem, Amsterdam, Enknisen, and Utrecht; in Germany at Hanover, Hamburg, Altona, and Heligoland; and in Denmark at Copenhagen and Elsinore. His architectural studies include town-halls, churches, museums, railway-stations, hospitals, theatres, schools, and palaces, also certain works of military engineering; but the larger and by far the more interesting part of his book is devoted to domestic work, which is illustrated by plans, sections, and elevations of the dwellings of all classes in town and country, including furniture and interiors with their decorations. The professional reader will recognize in these drawings the unlabored manner, the correct architectural delineation, the graphic and effective style, of the school of Viollet-le Duc. The only parallel to the drawings of this school which we can recall, are the rare and famous etchings of Israel Sylvestre (1621–1691), who had the faculty of presenting the essential architectural characteristics of the buildings of his time with such truth and graphic force, that his drawings, even when occupying no more space than the area of a thumb-nail, contained in due proportion all the essential elements of individuality, in each case, recognizable not only by the picturesque outlines, which any skilful artist might seize, but by architectural details which demanded for their proper setting forth under such circumstances, the finest sympathy and most accurate technical knowledge.

In treating of each town, the author devotes considerable space to the manners and customs of the inhabitants of various grades, and undertakes to show how their dwellings have been adjusted to these special conditions in each case; also what modifications of style have been created by the characteristics of the building materials, what traditional forms still linger in each place, and how reluctantly among these domestic and isolated peoples these forms have yielded to the innovation of fashion and novelty. His eye is quick to detect in every plan those points which have a bearing upon the nature of domestic service, and which in any way reveal the habits of life among the occupants, and the nature and degree of their culture and refinement.

In these observations concerning domestic architecture, M. Narjoux seems to us to have made a more important and original contribution to our knowledge, than in those relating to the more monumental structures, although these latter with the illustrative drawings are among the best of their kind, and contain just such distinctive qualities of excellence with regard to essential points as we have a right to expect from an architect whose mind is trained to a nice appreciation of points of design or construction, and whose hand swiftly and accurately follows the just impression.

It is curious to observe, especially in the arrangement of the Dutch and Danish dwelling-houses of all grades, not only how essentially the local requirements of domestic life there vary from our own, but how, in a less marked but hardly less appreciable degree, those of one town differ from those of another, its neighbor. But they all indicate the possession, on the part of the people, of thrifty household virtues, economy and neatness, with love of ease, and dislike of ostentation. As regards the Dutch, our author says, "Especially they have dwelling-houses very well suited to their character, their tastes, and their wants: these are small, sombre, detached, all alike, perfectly neat within and without, divided into a limited number of rooms of considerable size, with a small garden, where they cultivate the flowers which they love so well; this affords the Dutchman the most complete satisfaction of his desires and aspirations. He is there alone and at peace, shut in, with no neighbors, no prying looks, no noise. These houses are as well adapted to their inhabitants, as the inhabitants themselves seem made for them." As a characteristic example of the method of M. Narjoux, we quote his account of a type of dwelling-house in Rotterdam: —

In order to satisfy these tastes and habits, which, as we have seen, must leave the mind and imagination perfectly calm, the Dutchman, who loves neither change nor variety, who can comprehend nothing but symmetry and monotony, who seeks neither society nor intercourse with his neighbor, constructs for himself dwellings arranged exactly on a uniform plan, with scarcely even a variation in size; the only difference which exists in the front of their houses is in the shape of the gables, which according to the period of their construction, and the taste of the day, are more or less strange; and nothing can in every case justify their grotesque forms. (Fig. 11.)

Fig. 11. — Houses at Rotterdam.

The ground-floor (Figs. 12, 13, 14) is composed of two rooms of equal dimensions, separated by a partition formed of panels, so as to slide upon each other by means of rollers, which renders it easy to throw both into one. Opposite to the street door is the staircase leading upward to the first floor, and downward to the basement, where are the kitchen, the room for coal or peat, the cellars, a bath-room, and closets.

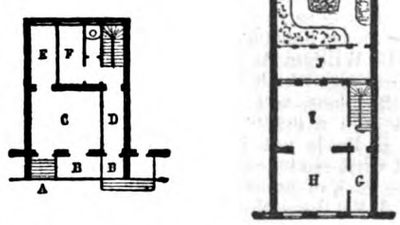

Fig. 12. — Basement.

Fig. 13. — Ground-floor.

Fig. 14. — First-floor.

A. — Kitchen Entrance.
B. — Area.
C. — Kitchen.
D. — Coal-hole.
E. — Wine-cellar.
F. — Bath-room.
G. — Hall.
H. — Drawing-room.
I. — Dining-room.
J. — Green-house.
K. — Bed-rooms.
L. — Dressing-room.

There is direct access to this underground portion from without, and in order to give all the light and air possible, an area of from 3 feet 3 inches to 5 feet wide separates the front wall from the public way, and keeps the passer-by at a distance. The upper story comprises two apartments similar to those on the ground floor, a dressing-room over the hall, and a closet. If the house is of greater importance, there is another story or even two or three above it, but the latter case is very rare. The attics are used for stores, and in order to avoid any thing being carried up or down the staircase, a pole with a pulley attached is fixed on the outside, by which all packages can be raised or let down.

As for Hanover and Hamburg, although their position in commerce has made them more cosmopolitan, and although they affect English forms more or less in their later works, which therefore have less of novelty to us, yet the domestic characteristics do not fail to give a mark of strong individuality to the arrangement of their dwellings; of the interior decoration and furniture of these, our author has much to say. In the latter, according to the drawings, the principles of Gothic construction are carried out with a fidelity which would commend it to the disciples of Eastlake, although it might prove to them that there are good things of this sort which do not come from England.

[1] Notes and Sketches of an Architect, taken during a Journey in the North-west of Europe. Translated from the French of Félix Narjoux, by John Peto. Author's edition from advance sheets, with 214 Illustrations. Boston: J. R. Osgood and Co., 1877.

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The street architecture of Hanover is profusely illustrated, but a marked partiality is given to the works of his friend M. Oppler. Indeed, with the exception of M. Cuypers, at Amsterdam, this architect is the only member of the profession who is honored by name in this book — an omission the more to be regretted, as it seems to supply an excuse to non-professional writers for continuing to treat works of architecture rather as a nameless growth than the production of artists with inspirations like those of sculptors and painters, whose names and titles are carefully set down in the catalogues, and cherished as a necessary possession by all who pretend to have a knowledge of art.

The book seems fairly translated, although in the descriptions of the plans there appears an occasional want of conformity, if not of intelligibility, which should be attributed, we presume, to a misunderstanding of the original text. The book is well presented by the publishers, and is notable not only for the qualities which we have indicated, but for presenting in its 214 woodcuts an array of fresh architectural *motifs* which the professional mind will be prompt to appreciate. The text, however, so far as it relates to Germany at least, is disfigured by a grotesque exhibition of the national dislike to the Germans and all that belongs to them. But the impartial eye, reading between the lines, can readily discover the sound architectural sense, which, after all, is the distinguishing quality of the book.

A similar journey through our own land by a foreigner equally well equipped would, if set forth in equal style to this, be of great service to us and to art; and, as an enterprise, might meet with great rewards. We would venture to commend it especially to the consideration of Frenchmen.

CORRESPONDENCE.

PUBLIC BUILDINGS IN BROOKLYN. — PLANS FOR THE NEW JAIL. — CHARGES OF BRIBERY. — THE LONG ISLAND HISTORICAL SOCIETY'S BUILDING.

NEW YORK.

THE city of Brooklyn seems as a municipality to be architecturally unlucky, considering its position as the third city in point of population in the Union, its public buildings being worthy of a backwoods town. The culture, learning, and taste of the citizens find no expression, and meet no response in the edifices where the public business is transacted. A Municipal Building has recently been completed, and however severe I may have been in speaking of the manner in which the work was entered upon, it was not too strong for the paltry conclusion reached. A poor and showy façade is topped out by a riot of metal cornices, pavilions, and French-roof dormers. The result was natural, and came directly from the work of a set of greedy political city-fathers, each coming to the selection of a plan as the retained representative of some plan-maker. A compromise ostensibly over two designs, but really a division of the fees and pickings, gave the "job" to two of the clamorous applicants; and Brooklyn is blessed with a concrete architectural nightmare.

Just now a quarrel is in progress in the Board of Supervisors over the choice of an architect to carry out the erection of a new jail for which $300,000 are to be expended. A committee on the jail was appointed, and Mr. William A. Mundell was requested to prepare plans and specifications, which he did; and a day or two ago the Board received the plans, and proceeded to discuss the employment of an architect in a manner which must have been torture to Mr. Mundell if he is not hardened by experience; while for an exhibition of what crude notions men holding responsible positions have of the work of architects, and by what standards they should be judged, the discussion was unique. The committee recommended that the plans presented be adopted, and the architect employed at the usual five per cent commission; and, to have the members vote intelligently, moved a recess of thirty minutes for the examination of the plans — which was certainly liberal, considering the block plan is 225′ x 325′, and the details rather elaborate.

One supervisor wanted an architect called in to look at the plans, and read the specifications. Another official said, as to the proposition to call in architects to inspect them and pass judgment, he believed that the more architects he called in, the greater would be the confusion and difficulty in arriving at a safe conclusion, because there was professional antagonism which would come into play, and defeat a fair judgment. The question for them to consider was, Had they confidence in Mr. Mundell as an architect? If they were going to submit them to architects for their judgment, they would go on until the crack of doom without having a new jail.

Another of the Board was in favor of more deliberation, lest by being over-hasty in adopting plans they found that they were called on to make alterations in new buildings which might have been avoided. This was the case all over the country. He had recently read books on architecture, and discovered that large buildings in London and Paris were put up without any alterations in the original plans being necessary. The reason of it was that on the other side they were careful in adopting plans. All the necessary steps were carefully considered before the work was begun. He would like to have the judgment of a competent builder on them and the specifications

The question of the commission to the architect then came up, and for an hour or more the Board displayed its collective ignorance.

A supervisor stated that it was too much to pay the architect five per cent for his services, which would amount to about $15,000, estimating that the cost of the new jail would be $300,000. The two architects on the new Municipal Building received only 2½ per cent on the cost.

The next motion was to print a number of copies of the specifications, but it was pointed out that as yet the Board had no control over them. Mayor Schroeder then said, "I move that the plans be adopted, provided that the architect accepts as his compensation 2½ per cent."

Another supervisor thought the rate proposed by the mayor, which would secure to Mr. Mundell about $7,500, was a fair compensation. Any professional man, though he should stand in the front of his profession, would be glad to accept it for services which would cover only about eighteen months. It should be borne in mind that Mr. Mundell's entire time would not be given to superintending the erection of the jail. He would still be at liberty to attend to other buildings. Moreover, the advertisement of his business arising from the superintendency of such a work would be worth more to him than $7,000. He argued that inasmuch as business and professional men had been obliged in these times to contract their prices, Mr. Mundell should do likewise. As far as he knew, five per cent was the highest compensation paid an architect at any time, and as other professional men have been compelled to lower their compensations, Mr. Mundell ought not to be an exception; which is certainly a very thrifty view, but entirely sophistical considering that the architects' fees fall with the reduction in the estimates of contractors.

Mayor Schroeder, in response to the remark of the committee that five per cent was the usual amount paid, said, "I deny that five per cent is the usual allowance to architects. I have had a great deal of building done for myself, and I can employ the best architects in my private capacity as a citizen, to make plans for three to four per cent. It is not necessary to employ a superintendent." Members cited instances of cheap contracts with architects; but your correspondent could have given them cases where so-called architects took work without any commission, and dear work it turned out for the owners. Compromises of three per cent were suggested, when at last the dickering was suddenly arrested by a charge of one of the members, that bribes of $250 per man had been offered for votes to the Mundell plans. At once there was a storm of well-assumed indignation, and an investigation was ordered. Throughout the talk not one word had been uttered on the merit of the designs, not a breath of an artistic instinct, — and I assume that a jail may be designed with some respect to the canons of art, — but a petty question of fees.

Turning from this company, it is refreshing to learn that Brooklyn is to have something fine if the Long Island Historical Society carry out its present purpose of building a permanent home. On Tuesday evening the 20th, a meeting of directors will appoint a building-committee; and then on a plat of land within a stone's throw of J. C. Cady's Academy of Design, and P. B. Wight's Mercantile Library, two of the best-designed buildings in the city, Mr. Eidlitz, if current rumor be true, will erect something in his best vein.

W.

THE PENNSYLVANIA HOSPITAL FOR THE INSANE.

PHILADELPHIA.

ON Tuesday the 13th the commission lately appointed by the State to select a site and erect a Hospital for the Insane for the Eastern District of Pennsylvania, chose of the five premiated architects, Messrs. Wilson Bros. to carry out the work. The design offered by this firm, which will be the ground-work of the working drawings, proposes to occupy a plat eight hundred by eleven hundred feet. On this it is proposed for the present to put up fifteen detached buildings. Eight of these, four to the front, and two to the rear, in *échelon*, with one at either side at right angles to these, form a hollow square; each building being one hundred feet from the adjoining building, and connected with it by a corridor having a stone basement and open gallery of iron above; the former for air flues and tramways. The central group of the front is the administrative building of three stories with basement and attic, having a tall central tower capped with a pyramidal roof in two stages, and belfry windows with large clock faces in their tympana on each of the four sides. The administrative building contains about twenty-four rooms. To the rear of this building are the chapel and the kitchen; and to the rear of these and the central object of the square is the boiler-house with its tall and ornamental brick chimney. This building is flanked on either side by a workshop, and in the rear of all on the open side of the square is placed a small dead-house. For the present there will be eight wards, half for males and half for females. Six of them will have accommodations for one hundred patients each, and two for seventy-five each. These buildings are each two hundred and sixty-four feet long, and consist of basement and two stories, the

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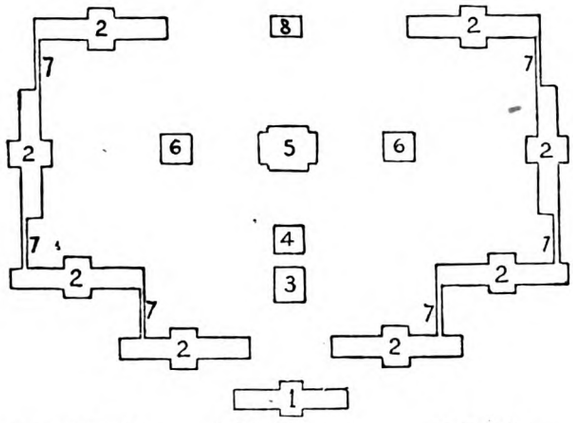
rooms opening on a central passage. Each building has an entrance in the centre, which, the basement being high, will be approached by a flight of marble steps. The general construction of the building externally will be of red brick relieved by courses and



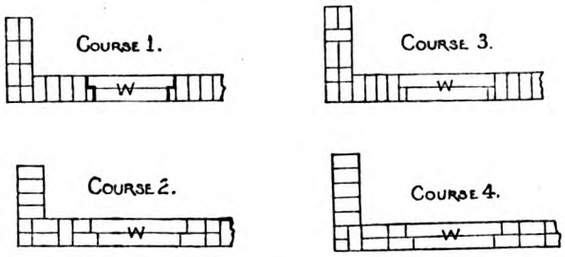
1. Administration.
2. Wards.
3. Chapel.
4. Kitchen.
5. Engine and Boiler.
6. Work-shops.
7. Corridors.
8. Morgue.

segmental arch-heads of stone. The roofs, which are of a rather low pitch, are to be of slate. The arrangement of the buildings allows of two other wards being erected in the future in *échelon* in the rear, which will complete the hollow square. Each ward will be provided with a stairway at either end, and also a private stairway in the central portion of the building. The stone to be used, though not definitely decided upon, will probably be the blue marble which abounds in that locality.

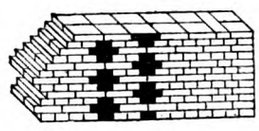
AMERICAN BRICKLAYING.

ST. LOUIS.

A POINT in American building which deserves attention is the bond of the brick walls. The total absence of any substantial, reasonable method of binding the bricks is in some parts of the country about the first thing to attract the eye of a foreign architect visiting this country, as we may see from time to time by remarks in the prominent technical papers of Europe. In an article published in the Vienna *Allgemeine Bauzeitung*, a very able architect, Mr. Gruner, writes, "One notices with astonishment that there is no sign of a rational bond." He comments rather severely on the merits of our American bricklayers, which I do



not consider just, the architects and contractors being really to blame, and continues, "The walls are so built as to consist of several parts connected by the intervening layer of mortar only; the outer portion or face is formed of stretchers entirely. After the great fire in Chicago, there were instances of walls separating so that one half fell on the streets, the other inward!" Indeed, the form of the bricks renders a regular bond impossible, but the aversion to the same is so great that channels for ventilation, etc., are formed in the walls with the help of tin flues. Stone fronts in many cases are not bonded to the main walls at all, being generally plastered on with cement.



Is it because the architects think the matter of so small importance, that they allow these abuses? Why is the English bond such a stranger among bricklayers? An American architect once said to me that "other bonds were not used here because the water had a better opportunity to penetrate the wall." This I believe to be wrong. Although I do not consider the English manner the best, it is preferable to any I have noticed in this country. Gwilt in his *Encyclopædia of Architecture* condemns even the Flemish bond in strong terms; but the American bond is certainly much worse. The former has at least some pretension to a transverse connection of the wall; but the placing of a row of headers every fourth, fifth, or sixth course (sometimes it only occurs every eighth), this being the whole binding used in America, is not at all sufficient to bond the parts of the brick-work, and there are many buildings whose fronts show not a single binder. That such a bond ruins quantities of brick-work in the course of time, is certain. A close observation of brick houses discovers cracks of all shapes and in all positions, whose origin may easily be traced to the miserable bond.

I should like to call attention to a manner of binding brick-work used exclusively in all better classes of buildings in Germany. The German Government prohibits the use of any other in its buildings, with the exception of some cases in fortifications where the head bond consisting of nothing but headers is used. It is preferable to the English in that the longitudinal connection is closer, having in addition to a regular change of the vertical joints in the header and stretcher courses, a similar change in the stretcher courses themselves, the vertical joints coming in line only once in five courses. The sketches show exactly the order in which the bricks are laid. But for this or the English bond we must first have bricks so formed that two heads plus the joint equals one stretcher.

One reason why our brickwork is less substantial than the German is that our fat lime is not given time enough to slack sufficiently before it is used. There are always portions which require more time to slack than the main body. In Germany the lime is slacked and then allowed to run into pits, where it remains four to six weeks before it is used. The want of room does not allow this operation to be performed on the building-site in many instances, and the larger contractors have their own pits generally as close to the railroad as possible, where they slack the lime, which is then transported from these pits to the buildings in carts built expressly for the purpose. Great care should also be used in slacking the lime, that neither too much nor too little water is used, as either error reduces the binding properties of the lime. We need not say that particles of unslacked lime are very injurious to brick-work.

For the proportion of lime to the sand, Menzel, a well-known German architect, gives the following rule: "Take a certain quantity of the sand to be used, and pour water on the same until it will absorb no more. The quantity of water used is equal to the amount of lime necessary." C. C. H., JUN.

RAPID PLASTERING.

MR. HITCHINS, of Stoke Newington, has introduced, says the *Building News*, a new method of forming ceilings and other plaster-work, which, for durability, saving of time, and cleanliness, is unrivalled. By means of this system, the plaster is prepared beforehand in slabs, which are fixed expeditiously to the joists, forming the ceiling at once, as it would be when lathed and plastered with the two coats of lime and hair in the old process. The slabs, or sheets, are made in the following manner: A layer of plaster of Paris, in a moist or plastic state, is spread evenly on a flat surface, surrounded by raised edges of the form to produce the desired bevel of the edges of the slab or sheet; and upon this first layer of plaster is laid a sheet of canvas or other woven fabric of proper size, or a thin layer of loose fibres, which is made to embed itself into and adhere to the plaster. Two laths are then laid along two opposite edges of the canvas, upon which another layer of plaster is spread evenly; and before it sets a rough broom is passed over the surface of this second layer of plaster to form a key for the finishing coat. When the plaster is set, the slabs are nailed to the joists, as before mentioned, and the joints are made good with plaster of Paris. The third or finishing layer of lime and plaster is then applied to the ceiling in the ordinary way. Besides the advantages derived from rapid fixing, with the minimum of dirt and inconvenience, the new ceiling is practically uninflammable, and very economical to put up. Moreover, unlike the old plaster ceilings, it can never become detached from the joists; in fact, besides being self-supporting, it braces and strengthens all partitions and slight timbers.

NOTES AND CLIPPINGS.

ACCIDENT TO A CHURCH. — The flooring of the Methodist church at Searsport, Me., broke down the other night, through the beams rotting off. A revival-meeting was in progress, but no one was injured. A similar accident occurred at the same church about four years ago.

NEW ARCHITECTURAL PHOTOGRAPHS. — Messrs. Bedford, Lemere, & Co., of London have sent over another portfolio of photographs, containing 100 views of their latest work. The collection embraces buildings by Devey, Callcut, Shaw, Robson, Waterhouse, Bloomfield, and Butterfield, also a collection of views of old half-timbered mansions and churches of the sixteenth and seventeenth centuries. These may be seen at the office of H. Hudson Holly, 111 Broadway, New York.

CEMENT FOR GLASS, ETC. — A new and very strong mucilage, capable of fastening together wood, porcelain, or glass, is described in the *Journal de Pharmacie*. To a strong solution of gum-arabic, measuring 8½ fluid ounces, add a solution of 30 grains of sulphate of aluminum, dissolved in two-thirds of an ounce of water.

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MONUMENTS TO GEN. LEE. — The design of Mr. John Roy, a local sculptor, has been adopted for the $30,000 monument to Lee to be erected at New Orleans. It proposes a mound of earth 188 feet in diameter at the base and 12 feet high in the centre, sloping in all directions to the ordinary ground level, the central portion 72 feet square, to be level at the elevation of 12 feet. The slope on each side of this centre square will have a base of 58 feet and a rise of 12 feet. In the centre of this mound the monument proper will be placed upon piles, capped with timber spiked and bolted to the piles, then, to preserve the wood from decay, covered with concrete, upon which the brick and granite foundation will be built, which will receive the marble column that is to sustain the statue. A white marble Doric column, 10 feet in diameter at its base and 60 feet in height, with winding staircase through its centre, will be placed on a granite stylobate of four steps each 3 feet high; and the statue of Gen. Lee, 15 feet in height, will rest on a die 7 feet 8 inches in height, thus making the entire height from the ground to the top of the statue 106 feet 8 inches.

Meanwhile the Commissioners of the Lee Monument Association at Richmond have postponed for one year the award for an equestrian statue of Gen. Lee, because of a disagreement with the Ladies' Memorial Association, and a lack of money without their aid.

DEFACEMENT OF A SOLDIERS' MONUMENT. — The monument to the memory of the Confederate dead at Chattanooga, completed and ready to erect, was defaced beyond repair Saturday night Nov. 17, by unknown persons.

THE HUDSON RIVER TUNNEL. — Now that all legal opposition to the Hudson River Tunnel has stopped, there is no doubt but that work on the tunnel will be pushed forward without delay.

A GLASS ROOF. — The new Union Depot at Pittsburg, Penn., is to be covered by a glass roof, measuring 600′ x 140′.

STATUE TO GEN. GREENE. — The Rhode Island delegation has selected the circle at the intersection of Massachusetts and Maryland Avenues, Washington, as the site for the equestrian statue of Major-Gen. Nathaniel Greene, now being executed by H. K. Browne.

THE HIGH BLANTYRE COLLIERY EXPLOSION. — A singular feature of the explosion in the High Blantyre Colliery, Scotland (by which 215 lives were lost on Oct. 22), was the uprush of the burning gas through the downward shaft, though the gas is believed to have taken fire at the base of the upcast shaft. The shortest passage between the two shafts in the mine was fully a third of a mile long, and the ventilation threw out 100,000 cubic feet of air per minute. Although the reversal of this great current of air at the time of the explosion seems strange, it is not without precedent. The following extract from a lecture delivered by Professor W. W. Smyth, before the Royal School of Mines, London, and recently published in the *Engineering and Mining Journal*, indicates the chances of such an occurrence: "Some strange effects occasionally follow these accidents; thus the lecturer has seen one case himself where the ventilating current was reversed by the explosion, and all the smoke, etc., drawn back into the mine, where the air could be seen oscillating for a short time over the upcast, and then going bodily down. In this case every one in the mine was killed." Professor Smyth recommends that there should be a great distance between the shafts, so as to afford the miners abundant room for escaping from the ignited gas and the choke-damp which follows it. But, although this precaution was not wanting in the Scotch mine, no advantage could be taken of it in rescuing the unfortunate miners, because the walls of the passages were thrown down and the shafts were also choked with *débris*. Many hours had to be spent in removing obstructions, and meanwhile nearly all the inmates of the mine were suffocated. — *N. Y. Tribune.*

THE NEW LONDON POST-OFFICE. — The site of the proposed new Post Office on the Thames Embankment, London, extends from Blackfriars Bridge to Temple Gardens.

ASPHALT PAVEMENT. — The alternations of heat and cold so affected the asphalt pavement of one of the foot-bridges over the Seine at Paris (the *Pont des Arts*), that the vibration of the bridge caused innumerable cracks and rifts to penetrate its substance. A new paving of slabs about sixteen feet square has been lately laid. These slabs, which are composed of gravel and asphalt in the usual proportions, are divided from one another by a space one and a quarter inches in width, which is filled with pure asphalt. It is hoped that the superior elasticity of the pure asphalt will prevent further deterioration through contraction or oscillation.

PERMANENT TRADE EXHIBITIONS. — A German paper states that a permanent exhibition of German manufactures will soon be opened both in Hamburg and London, where both exporters and importers will be able to confer and have an opportunity of seeing the latest productions of German industry. A similar project has been submitted by Mr. Firmin Dufoure to the leading merchants of France, and through Messrs. Windslow, Lanier & Co., bankers, has brought the subject of the proposed exhibition or exchange before the merchants of New York. Of it he says, "It would not be an exhibition in the ordinary sense of the word, but an international exchange for the purchase and sale on commission of goods. A large building in Paris would be devoted exclusively to American goods and for the shipment of French goods ordered by a similar establishment in New York, which of course would contain the French samples, and would, if necessary, ship the products of this country ordered through the Paris branch."

MODELS FOR GERMAN PATENTS. — The only articles for which models are required in German patent applications are fire-arms.

DISCOVERY OF A CRUSADERS' CHURCH. — On the road from the Mount of Olives to Bethany the remains of a Crusaders' church have recently been discovered. In his official report, which appears in the *Athenæum*, Lieut. Kitchener states that tradition has long pointed out this spot as the place where the Saviour mounted the ass for his triumphal entry into Jerusalem. In the chapel, which dates from the twelfth or thirteenth century, there is an almost square block of masonry covered with paintings, which are well executed but badly disfigured. On the south side is represented the raising of Lazarus; on the north are the disciples fetching the ass; on the west there is a niche covered by an arch which was probably supported by two small columns; below the niche is a portion of an inscription still remaining. This square block is supposed to be either an altar, a shrine, or a portion of the rock cut out and ornamented. The walls of the small chamber to the south are also painted with a design of squares containing circles, and the walls of the church are painted in a common pattern. The shield of Hamseh has been taken down from the mosque by the Pasha, and is now in the Serail. It appears to have been the cover of a baptismal font, or of some vessel, and is made of bronze, containing a great deal of silver. The work appears to be Italian of the twelfth century, and is very beautiful.

TECHNICAL SCHOOLS ABROAD. — It appears from recent reports of the Commissioner of Education, that Austria maintains 1,037 schools for technical instruction, 4,296 teachers, and 67,713 pupils; besides which there are schools of forestry, mining, and agriculture. Bavaria shows 1,671 industrial schools for girls, with 1,837 teachers, and 71,635 pupils; also a polytechnic school at Munich, 36 technological schools, 4 of agriculture, with many courses of lectures on practical subjects. In Germany there are 34 schools of architecture, 25 of mining, 17 of forestry, 108 of commerce, 146 of agriculture, 10 veterinary, and 86 other technical schools. Denmark has 49 "Farmers' High Schools," with 3,135 students, of whom, curiously enough as it would seem in this country, 1,003 are females. In Holland there are 11 navigation schools and 32 industrial and drawing schools. In Switzerland no less than 4,373 females are employed in schools teaching needle-work.

COLOR-POISONING. — A belief in color-poisoning by means of green dresses and wall-papers has already been forced upon the public by some tolerably conclusive evidence; but it seems that the mischievous propensities of this color are far from being fully exposed. A French *savant*, M. Paul Bert, has just exhibited against it articles of impeachment of the gravest character, supported by reports of a whole series of startling experiments. If his theory is true, it is not only the arsenic used in producing the color which does the injury, but the actual color itself; and a mere ray of green light is capable of affecting the health of the person exposed to it, apart from all aid afforded to it by the smell or presence of arsenic. To demonstrate this alleged fact, M. Bert has submitted several specimens of the sensitive-plant to rays of different colors thrown upon them through stained glass; and in every case those which were treated to the most brilliant green light withered and died in the shortest time. In those plants which were exposed to a red light, a peculiar phenomenon was observed; the tip or spikes of the leaves prolonged themselves, and grew forward in a lean and hungry fashion horizontally with the branch from which they sprang; while in a blue light the contrary effect was produced, the spikes standing out abruptly and perpendicularly from their stem. On one of the plants being enclosed in a sort of lantern, having red glass on one side and green on the other, instead of shrinking away from the poison on their right to the roseate antidote on their left, the leaves, as if by a fatal fascination, turned with one consent the other way, and literally looked death in the face. — *Pall Mall Gazette.*

MUSK. — The enduring odor of musk is marvellous. When Justinian, in 538, rebuilt what is now the Mosque of St. Sophia, the mortar was charged with musk, and to this day the atmosphere of the building is filled with the odor; which may be due to this cause, or as probably to the burning of incense as may possibly be customary in the mosque.

INSTANTANEOUS LIGHTING. — Some Frenchmen have recently patented a contrivance for obtaining instantaneous light, by merely depressing a button. The movement enables an electric current to pass through a platinum wire, heating it to redness; the wire being surrounded by an atmosphere saturated with benzine, quickly becomes white hot. This lights a small lamp which burns benzoline, and gives a very bright light. The whole apparatus is compact and portable.

EXPLOSION OF A GAS-HOLDER. — The gas-holder of the new gas company at Indianapolis exploded at noon, Nov. 15. The force of the explosion was felt at the Arsenal, three miles distant. The holder was ninety feet in diameter and eighteen feet in height, and was seen first to rise up from its position of half immersion in the tank to the full height, with a rumbling sound, and then burst into fragments. The top portion rose to a height of 300 feet. Fortunately the workmen had just left the yard for dinner, so that no one was hurt, although much damage was done to neighboring buildings. The works had just been completed. The cause of the explosion is supposed to have been the mixing of hydrogen gas with air, which was in the holder when the gas was introduced for the purpose of testing the mains recently laid. The loss is about $20,000.

A SUBSTITUTE FOR GLASS PLATES IN PHOTOGRAPHY. — Paper prepared with wax, and covered with collodion, according to a newly invented process, is offered as a substitute for glass plates for photographic purposes in exploring expeditions. It is said to retain its sensitive properties for more than two years, and the development after the impression is easy. The negative can be preserved for any length of time.

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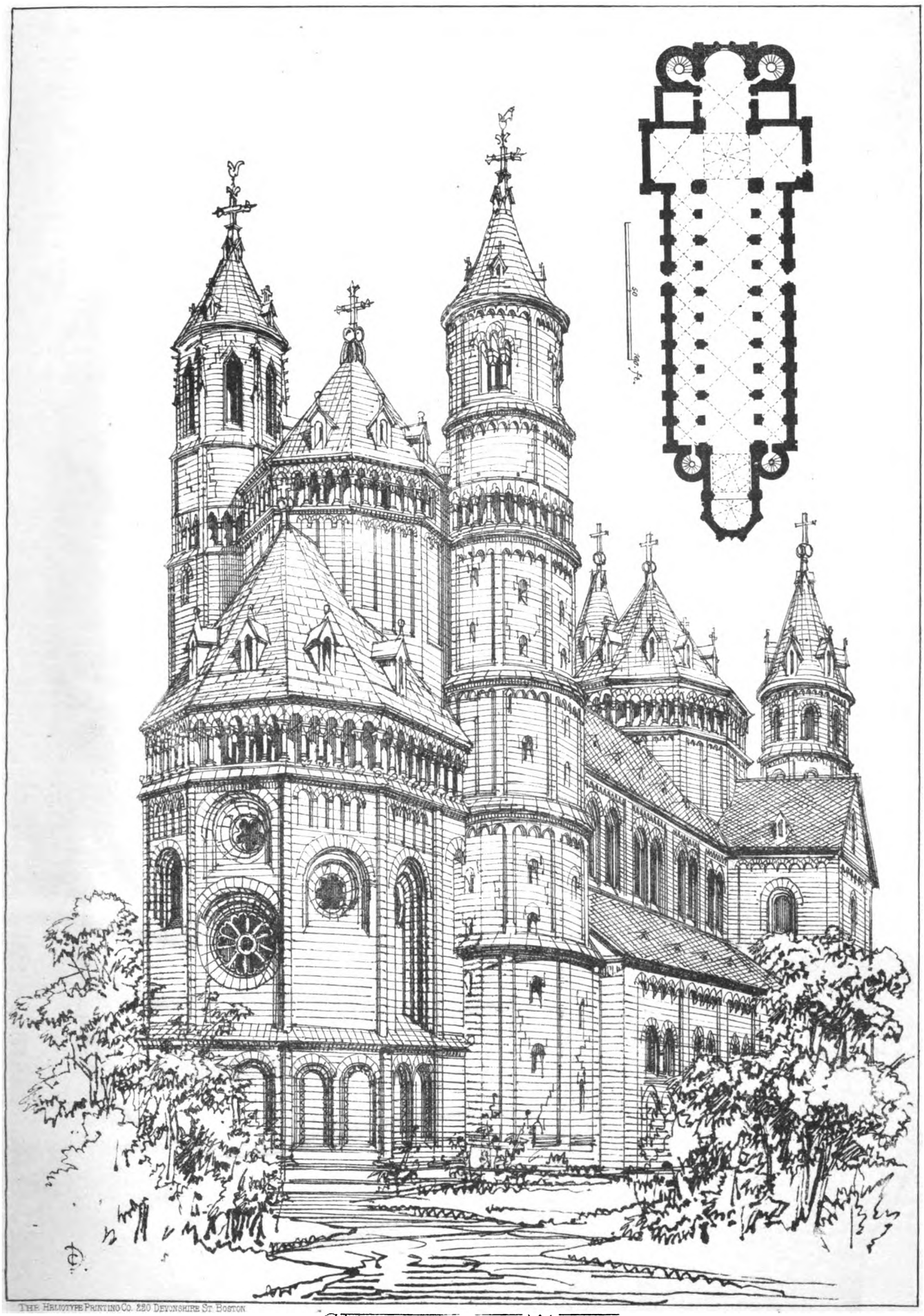

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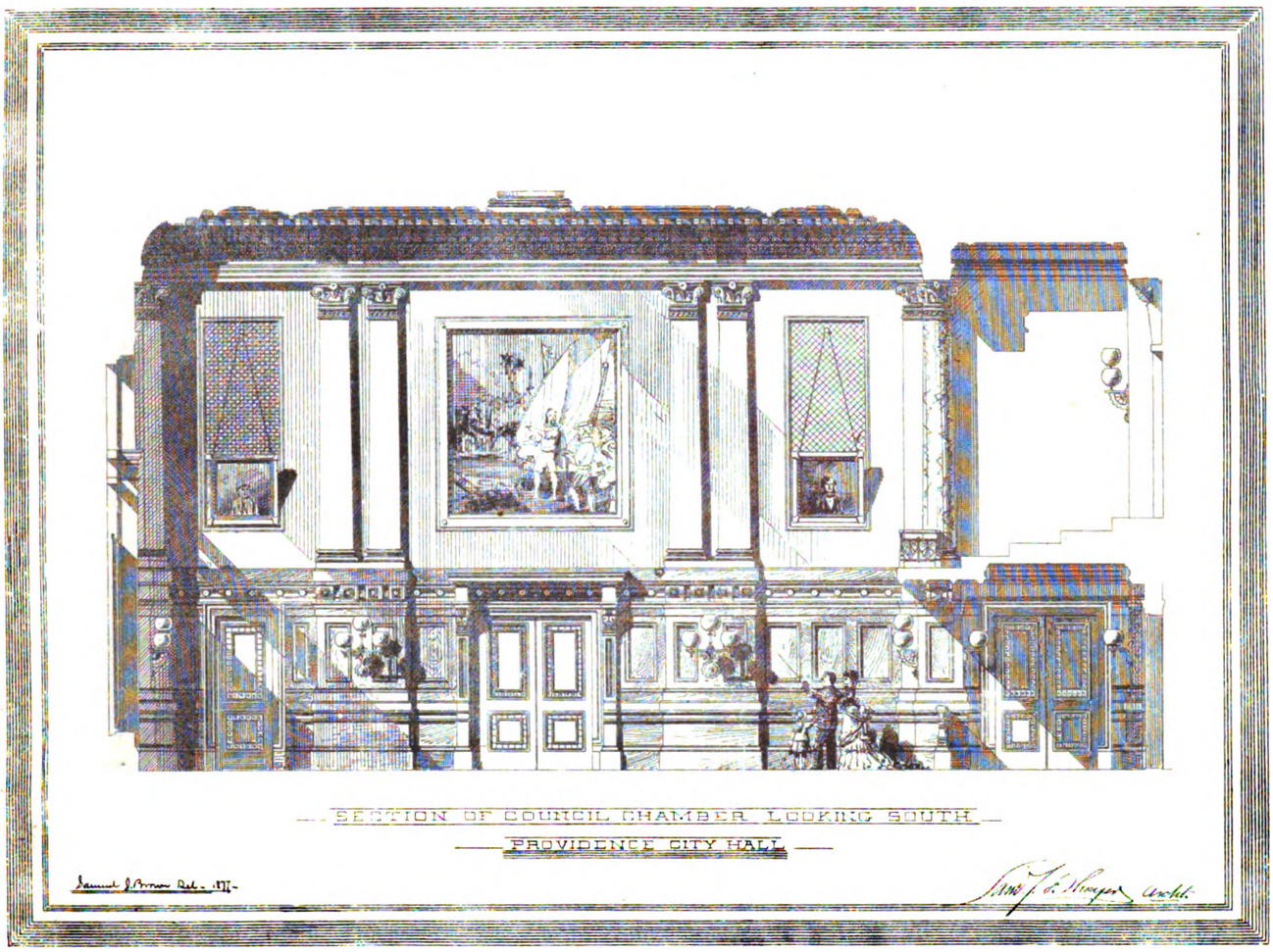

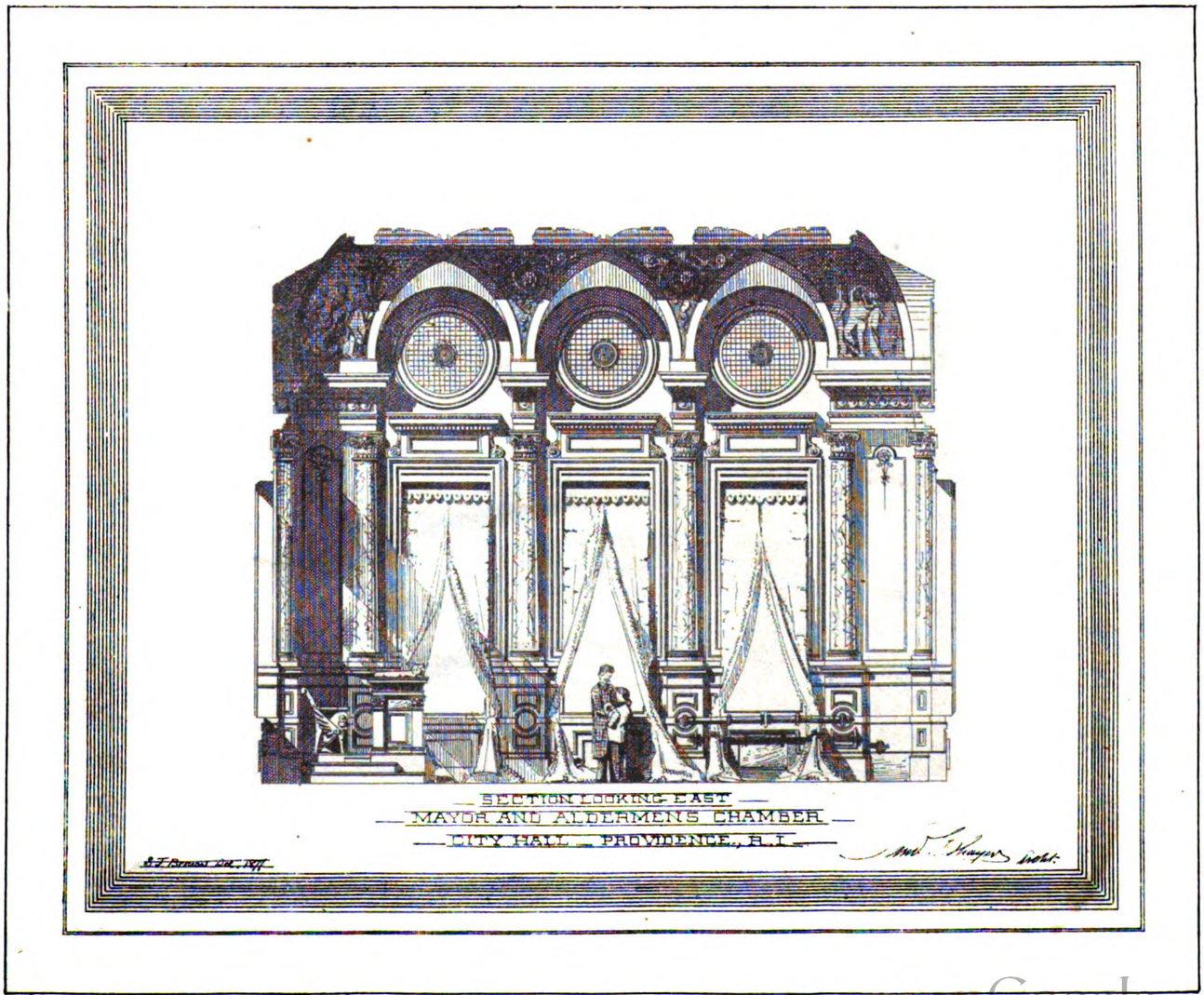

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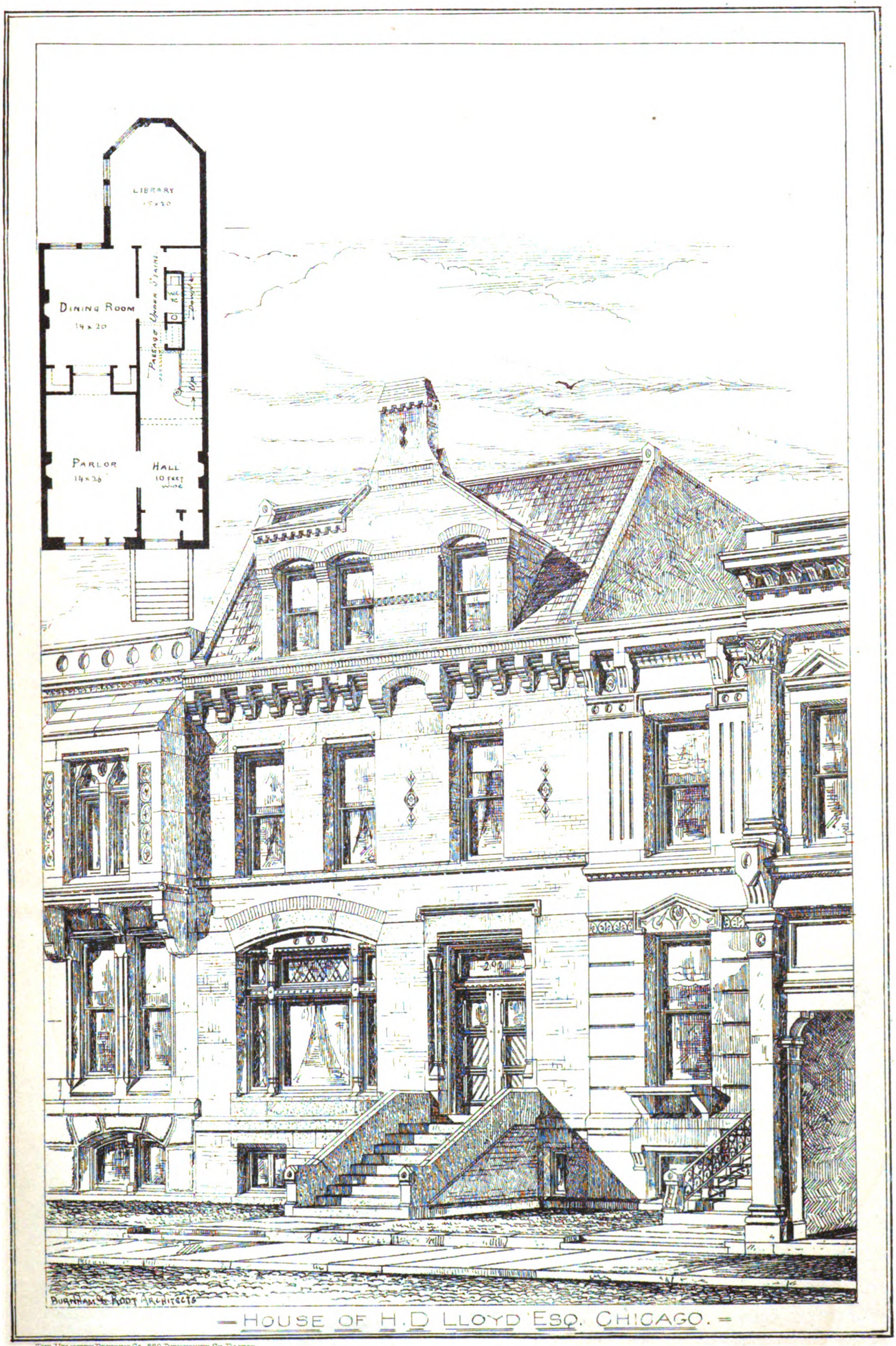

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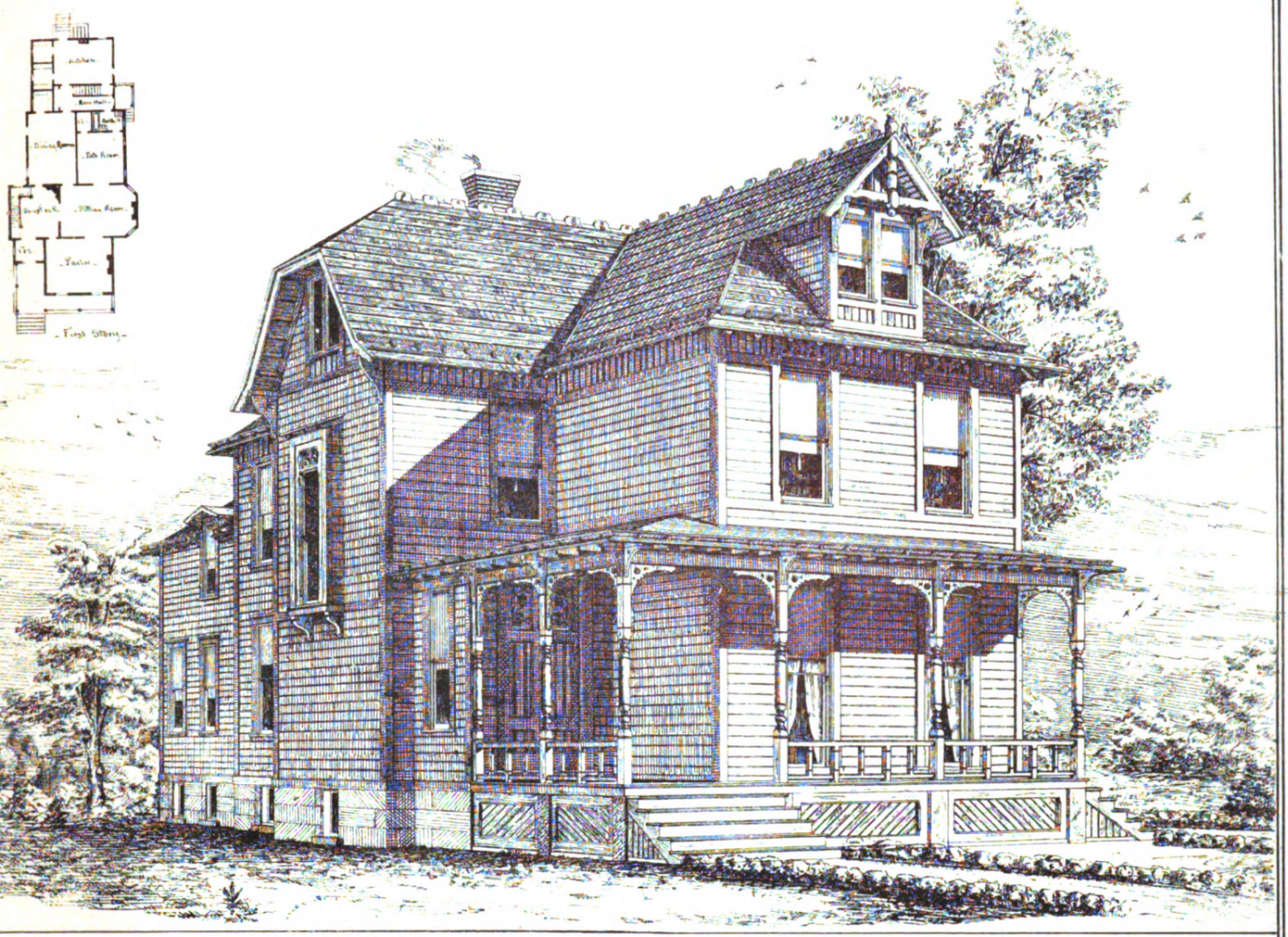
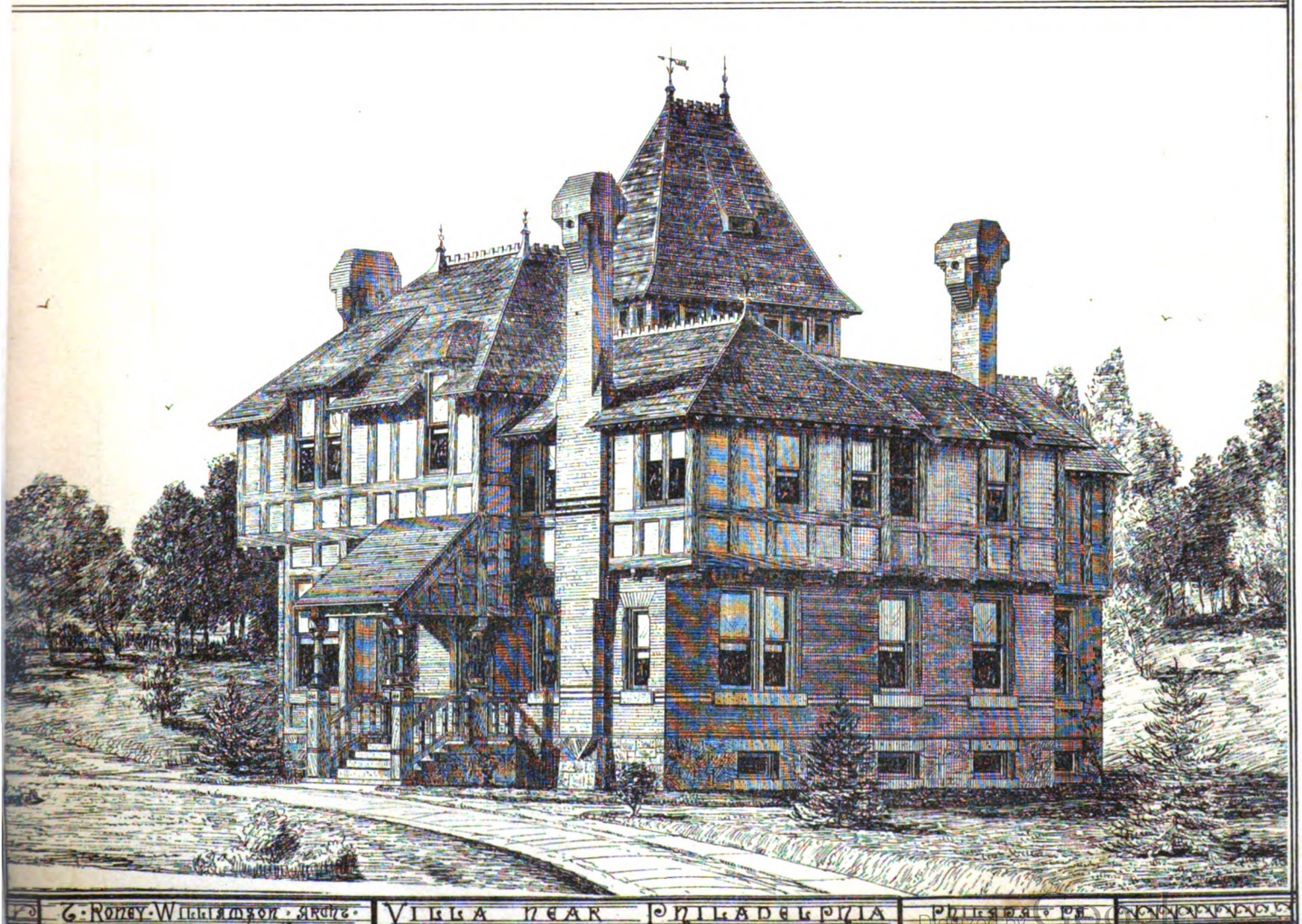


RESIDENCE OF W. H. HUNTINGTON, ESQ.—CLEVELAND, O.
— F. S. BARNUM, ARCHITECT —



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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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THE opening address to the Royal Institute of British Architects, by its president, Mr. Barry, which we find reported in the English building journals, seems to indicate that the Institute has made substantial gains during the past years. It had seemed for some time to be settling down into a condition of dignified inactivity, and to be ready to leave active work to its younger fellow, the Architectural Association, when a year or two ago it was decided that something ought to be done to increase the enterprise of the older society and give it an influence commensurate with its dignity. The appointment of a committee last year to suggest alterations in its constitution resulted in several changes; among them the remodelling of the Council, the governing body of the Institute, making it a more permanent body of the older and abler, or at least more influential men, and the establishment of a new order of members, called Honorary Associates, who would be, it was hoped, outsiders of position and influence, and were expected to be a connecting medium to extend the influence of the Institute among the public. The election of Mr. Barry as president, whose energy and practical sagacity are well known, was relied on to second these efforts. The result seems to justify the expectation. The membership of the Institute, six hundred and thirty-five, is larger than ever before. The establishing of Honorary Associates, which was thought to be an uncertain experiment, has been very successful; and the president named a list of upwards of forty gentlemen, most of them distinguished in art or affairs, who desired to be enrolled among them. In regard to them he said, — and the remarks are suggestive for others than the members of the Royal Institute, — "Through it [the new membership] our artistic brethren in the other walks of fine arts, of painting and sculpture, our amateur architects, . . . our church dignitaries, . . . our civil engineers, . . . our members of each House of Parliament, who have often to decide questions relating to our art and practice, . . . may, and I hope will, by becoming Honorary Associates here, gain much of the special knowledge they desire; will doubtless learn that architects have nobler aims than are represented by five per cent, and, albeit that represents their livelihood, can and do put it in a secondary position in relation to their clients, whether they are the public or are private individuals."

IN furthering its outside influence, and therewith the general esteem of the profession, which seemed likely to droop under the scorching attacks of Sir Edmund Beckett and Mr. Bentinck and other aggressive unbelievers, the Institute seems to have done a good work. The appointment of the president by the Prince of Wales, as a member of the British Commission for the Paris Exhibition of 1878, was no doubt a useful as well as a reasonable compliment. The advice of the Institute has been of practical service to the government in the preparation of a general code of building-laws for the kingdom. It has been enabled to make itself felt too in other public matters; being consulted by Parliament in regard to the question of copyright in the design of works of art, wherein it urged the rights of architects to property in their designs in a way that promises to be of benefit to the profession; and being designated, also by Parliament, as counsellors to the Metropolitan Board of Works of London, concerning the treatment of the great new thoroughfare in that city, called Northumberland Avenue (see *American Architect*, No. 75). This last duty was supposed to be a difficult and uncertain one, for the Board of Works has been thought a body rather intolerant of advice, given to a keen regard for rates, and to a cynical contempt for less practical things. The Council of the Institute seem, however, to have succeeded in preserving amicable relations with the Board, and in exerting some influence in the design of the buildings proposed for the new street. How great that influence was, is not clear from Mr. Barry's address; but it does not appear that the Council were successful in their reasonable desire to secure a coherent design for the treatment of the whole street. In fact, they were allowed to pass only on single buildings, and their moderate success may be conjectured from Mr. Barry's remark that, "although the Council could not give an unqualified approval even of the modified design, they felt that the Board at their instance had gone as far as they could be expected to do in requiring alterations which might seriously affect the expenditure." It should be remembered, by the way, that such street improvements are carried out in a way very different from ours; for, instead of simply appropriating the land actually occupied by the new street, and allowing damages, leaving the adjacent land to its former proprietors to make the best of, as is done in American cities, the Board of Works, as we understand it, condemns the abutting lots on the street, pays for them, appropriates them, and then lets them out on ground rents to whoever will lease them and build on them; but retaining, if it will, the power to prescribe what shall be built. The failure of the Council to fully impress its views is to be regretted; for such an opportunity to make a fine street, in a great city whose streets are not fine, does not often occur, — has not occurred before in London, we believe, since Regent Street was built, — and there is no likelihood that the thing will be better than a botch if the buildings are designed piecemeal. It is also to be regretted because there was a good occasion for the authorities to show reasonable respect to the advice of a profession whose advice in the designing of a thoroughfare or the adorning of a city is entitled to respect if anybody's is; and for the representatives of that profession to prove the value of its advice.

WE find in the *Architect* some significant statistics concerning the rapid increase of cost in building of late years in Germany and Switzerland, taken from some papers in a Swiss journal. Thus in Berlin the wages of masons rose one-half in five years from 1868. The observations go to verify the fact that has often been told elsewhere, — that as wages have risen, the efficiency of workmen has decreased. That a part of this increase is due to the general inflation of prices at Berlin since the war, and to the general depreciation of money, there is no doubt; but the difference is much too great to be accounted for only by these causes, and a similar increase has taken place in other cities of Germany and in Switzerland. In Berlin it is found, for instance, that the same force of masons which in 1868 would dress more than six hundred stones of one kind in a week would in 1877 dress only about three hundred; that is, that the production was diminished one-half, while wages had risen one-half; in other words, that the labor cost three times as much as before. That this represents a general tendency of the day, there is no doubt. Testimony is too universal, both in Europe and the United States, not to be convincing. Every reasonable person will rejoice at any real bettering of the livelihood of working-men; but when the improvement, if it is real, is made at such excessive cost to society, and when in addition it appears that the efficiency of the workman is greatly impaired, it becomes a serious matter. At first sight it would seem that at least the increase of cost is so much increase of the current earnings of the workman in the shape of wages, but even this is only partially true. In the first place, the house which costs twice as much to build as it used, takes a great deal longer in building, so that the increased sum spent in wages is distributed over a longer period; as in the Berlin example cited above, only one-half

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the increase was due to raised wages, and the other half to greater slowness In the second, a very considerable part of the wages nowadays is squandered by the trades-unions in strikes, and the workman who earns it has no use of it at all. A great body of English masons has been on strike for four months out of the last twelve, so that in the year they have only earned two-thirds of what their rate of wages would indicate. In two ways it happens, then, that the added cost of buildings fails to raise the earnings of the workmen, and a good part of it seems to serve only as a bonus on idleness.

THE San Francisco labor reformers quite outdo their English fellows in the drastic quality of the means by which they propose to set the world right. The peculiar turn of their eloquence makes one instinctively look about for the means of discipline by which unruly boys are kept in order. Not long ago one Kearney, in an open-air address to the "working-men," prophesied, "When I have thoroughly organized my party, we will march through the city, and compel the thieves [the Central Pacific Railroad] to give up their plunder. I will lead you to the City Hall, clear out the police force, hang the prosecuting attorney, burn every book that has a particle of law in it, and then enact new laws for the working-men." And now Mr. Kearney announces to another meeting that he has telegraphed to President Hayes that the working-men "have banded themselves together to resist, peaceably if they can, forcibly if they must, further immigration of the Chinese." It is our American habit to leave our rulers, and especially our President, at the mercy of everybody who chooses to intrude upon him either with personal concerns, or with admonitions, public or private; but it seems as if there were excesses of insolence from which even the chief magistrate of the country might deserve to be protected. There is a contrivance which has lately been revived in England with wholesome effect upon certain brutal disorders, which the humane president of a famous society in New York has lately recommended there, and which was found in times past to be an efficient corrective of offences against decency, — the whipping-post.

THERE seems to be at the West great faith in fire-ladders attached to buildings, — a faith which may be obstructive to better provisions for safety against fire. When we recorded the laws passed in Wisconsin and Illinois, to compel hotel-keepers to put wire ladders in every upper room, we ventured to say that they must prove inoperative or useless; and we have no reason now to think otherwise. The burning of Field, Leiter, & Co.'s great warehouse in Chicago naturally has stirred up alarm, since it was apparently due to the combustibility of the wooden roof and to its being above the reach of the firemen, and its fatality to the fact that the building had only wooden stairs. The result is shown in Chicago by the passage of an ordinance which orders that "All buildings except such as are used for private residences exclusively, of four or more stories in height, shall be provided with one or more metallic ladders or metallic fire-escapes extending from the sidewalk to the upper stories of such buildings and on the outer walls thereof." There would be a considerable convenience in making all the roofs accessible to firemen; and the ladders may do something, though we fear not a great deal, in giving an escape to people in a burning building. But they would certainly offer great facilities to burglars and other disturbers of the peace. We fancy that the difficulties of the police would be greatly aggravated in pursuing malefactors, if every fugitive found a ladder to his hand on every building. These dangers, it is true, might be lessened if the ladders did not start from the sidewalks, but were cut off below at such heights that the firemen could easily reach them by movable ladders, and that people might safely drop from them; but even these would be, to our notion, but a poor substitute for the precautions that ought to be taken. The Field and Leiter building had a wooden mansard above four stories of front. Such buildings, of which there are many in Chicago, are too dangerous to be allowed in a densely-built city; and any device of fancied security that encourages them, and takes the place of a law to reform their construction, is likely, we fear, to do more harm than good.

WITH such a question as came up in the discussion over the choice of plans for the Kings County (that is, substantially, the Brooklyn) jail, when the charge of bribery was raised among the supervisors, we do not consider that we need concern ourselves further than to say, since the matter was mentioned by our New York correspondent, that the committee appointed to investigate the charge reported no evidence, and that their report was accepted as satisfactory. Some discussion about architects' fees came up, which may have an influence on the comfort of the profession in Brooklyn. A Mr. William Field is reported to have sent a letter to the jail committee, in which he offered his services as architect of the jail for a commission of two and a half per cent, saying that this was nowadays considered a reasonable fee. Notwithstanding this Mr. Mundell, who claims the regular five per cent, was chosen architect by a vote of eighteen to five. Undoubtedly, in both cases it was understood that the commission was to cover the entire professional services of the architect, superintendence included, although this is not specifically stated in the reports we get. Mr. Field is reported as a member of the American Institute of Architects. We do not find his name in any accessible list of the members, and we doubt his being one of them. Certainly, if the story of his proposal is true, his proper place is outside the Institute. There is nothing that tends more to make the way of architects hard, and to deprive their profession of the common respect which it ought to command, than the effort of some of them to "undercut" the rest. Our unprofessional readers may be presumed to know that, whatever may be the concessions of individuals in order to get patronage, there is nowhere any respectable usage which makes the fees of architects less than five per cent for full services, and that they are quickly accommodated to a fall in prices by the decrease in the costs on which they are estimated. Not everybody realizes, however, how much less remunerative the fees are in proportion to the work done when there is little of it. An architect's current expenses are large, and when he has little to do a much greater proportion of his fees goes out for office-rent, draughtsmen, superintendence, and other expenses, than when he is full of work; so that not only are his fees less, but he gets a less proportion of them for his own compensation. The proposed jail is expected to cost three hundred thousand dollars, and is not likely to be less than two years in building. Five per cent on this estimate is fifteen thousand dollars. The expense of carrying on the work, if it is thoroughly done, will consume half of this or more; and if, for the remainder, the county gets the services of a good architect for two years, he will not be overpaid.

THE people of New York are still in trouble over the cleaning of their streets. The Sanitary Superintendent has lately reported to the Board of Health that the streets are dirtier than he has ever known them at this season, and intimates that unless something is done for them promptly, they must remain so all winter. The Street-Cleaning Bureau has declared the plan of burning the garbage to be a failure, and the only resource at hand has been the old habit of carrying the sweepings out to sea, and throwing them overboard. But of late the weather has been so rough, says the Bureau, that the scows cannot get to sea, and the city remains unswept. Under the stimulus applied by the Board of Health, the Bureau had, however, made an arrangement with a certain firm at Bayonne, N.J., in virtue of which it had begun to carry off three or four thousand loads a night. When we look to see what is done with these three or four thousand loads by the Jersey men, we find that they are used "to fill up vacant lots." It is not surprising, then, that the Bureau expects the interference of the authorities at Bayonne before long, and is casting about for some new device. Capt. Gunner, its superintendent, proposes the building of four large steam hopper-barges, which shall be seaworthy in all weathers, and able to carry off a thousand tons of refuse, and dump it twenty-five miles from shore.

A LETTER which we have just received reminds us of a promise we made at the beginning of this year to give our readers a series of papers on perspective. The promise is by no means forgotten, though we have been slower in fulfilling it than we hoped to be. The subject is one which for

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its proper development required that all or nearly all the papers on it should be prepared before any of them were published; and the preparation has proved to be a matter of time. An additional difficulty in providing the plates has increased the delay, but we hope now to redeem our promise before long.

THE LABOR TROUBLES.

THE STRIKERS IN ENGLAND.

IT does not appear that the labor war in England is coming to an end at present. The dispute between the shipwrights and employers on the Clyde appears to have been settled by arbitration. Lord Moncrieff, who was made referee, decided that the condition of shipbuilding would not allow an increase of wages. But in London the masons' strike is apparently no nearer a settlement than before; and now the carpenters and joiners have appealed to their masters for the same advance in wages for which the masons have been striking, and the inference is that if they are refused they will follow in the strike. The stone-masons' strike has been one of the most obstinate of its kind. For three or four months the masons have been out for a decrease of working hours and an increase of pay. Their pay is by the hour, the old rate being ninepence and the rate demanded tenpence, while the number of hours required weekly has been fifty-five and a half, which it is the object of the men to decrease to fifty. In some cases the employers have yielded, at least so far as the increase of pay is concerned. The contractors for the most important buildings now going on in London, including the New Law Courts and the Temple Buildings, however, have steadily refused to yield to the demands of the men; the contractor for the Law Courts taking courage perhaps from the provision in his contract that in case of strikes an extension of time should be allowed him. We have mentioned the first attempts to import German and American workmen. The Germans were tolled off before they had been at work three days, and sent home by the strikers, who paid their expenses: the Americans were disposed of still more promptly, and were induced to join the strikers at once. These "Americans," as might be supposed, were themselves imported Americans, by all accounts, fifty-five out of fifty-eight being Irish, and the other three Germans and Frenchmen. Subsequent importations have been more successful, and some sixty foreigners, Germans and Italians, were got to work upon the Law Courts, who were secluded from outside influences by providing special quarters and feeding them in the buildings themselves. But even with this the contractors have not secured themselves against a gradual falling-off, and the men have still been slipping away day by day. The importations continue however, and more men have been brought from the United States, Canada, and the Continent.

It is not surprising that such a process should have failed to supply the English market with a very trustworthy class of workmen, or that the heat of the conflict should have led to questionable acts. The workmen seem on the whole to have been cynically careless of good faith. The Germans who were first imported stole away in the early morning after one or two days' work, and were on their way to Germany before they were missed. The American carpenters who had been brought some time before to meet the strikes in the North had behaved no better. And a company of thirty-eight Canadians imported to London a few days ago to work for the Messrs. Dove, who have several churches in construction, melted down to one man in the course of a single day, all the rest having one by one taken their tools and disappeared among the strikers. In all these cases the passage-money of the workmen had been advanced by the firms which employed them; in all, therefore, their leaving was really running away with so much money. There has been little attempt at violence in London, because the masons have been too shrewd, and if subornation of fraud is any more respectable than violence we may perhaps say too respectable, to resort to it. But it is clear that the men who have consented to work have not been allowed to have a comfortable time of it. They have been hustled and hooted on their way to and from work; some Italians among them, whose uncommon looks made them especially obnoxious to a mob, were very roughly handled, one of them being seriously hurt. On the other hand there are complaints that the agents of the masters, in engaging the foreigners, did not give them fairly to understand the circumstances under which they were wanted, and kept the knowledge of the strike from them. This may be the case: if so, it shows not only disingenuousness, but a surprising want of forecast, for it gave the men the most convenient pretext possible for evading their promises. A few days ago some of the American workmen, who had been engaged in New York by Mr. Bird, the agent of the London Master Builders' Association, applied to be released from their engagement. They had signed an agreement to work for him for six months in London, and to repay their passage-money in instalments, allowing him to retain their tools as security. In London they were turned over to Mr. Booth, the contractor for the Temple Buildings, where work was stopped in July by the strike, whose foreman refused to let them take their tools and leave their work; and on the ground that Mr. Booth was not Mr. Bird, they appealed for a discharge. Inasmuch as their application was granted by the magistrate, it must be inferred that they were entitled to it; but it does not appear that they were the victims of any greater grievance than a contract that proved technically less binding than the masters expected; while it does appear that they got away with Mr. Booth's passage-money. There have been complaints more or less, on the part of the imported Americans, of bad treatment on board the steamers which brought them. Since however their specific complaints recorded are no worse than that their food was "pitched at them," their potatoes served with the skins on, and that they got nothing better from the surgeon to "keep their spirits up" than a dose of salts, we may infer that they were not more hardly used than steerage passengers are apt to be. So far as appears from the evidence, the bad faith is chiefly on the side of the men.

The mischief which the labor war is doing on all hands is formidable enough. Ship-building in the North has been greatly depressed by it, and the building trade is paralyzed all over the island. But the building-trades have perhaps not been exceptionally unfortunate. There is something pathetic in this passage, which has gone the round of the papers, from a letter of Mr. Crawshay, the Welsh "iron king," proprietor of works that have been running for two centuries: —

> "Trade is worse than ever it was, and I see not the slightest chance of Cyfartha starting again. I think so badly of trade altogether that I have no wish to see my sons remain in it. I do not think I can possibly live very long, and if I am able I shall sell the works before I die. There is nothing now to bind me to them, for I have been estranged from them by the conduct of the men. I always hoped and expected to die with the works going and the same feeling among the men for their employers as before; but things have changed, and all is different, and I go to my grave feeling that I am a perfect stranger, as nearly all my old men are gone."

This means a great deal more than the disheartening of one large manufacturer, or the breaking-up of one large business; it is an index of the disorganization which the war is carrying into all branches of industry. The immediate cost of the present strikes is enormous, both to masters and men. Apparently pretty much the whole business of building is at a stand-still. In London and other large towns, notably in Manchester, where there has been a long strike of carpenters and joiners, a very great amount of capital is lying idle, very important works stand interrupted, and contractors are under heavy losses. The mere cost of importing workmen has been considerable, and apparently most of it has been wasted. One firm alone spent two thousand dollars on the two-score men it brought from Canada, without getting a day's work out of them. The masons' union has been paying about six hundred dollars a day to the men on strike, who are some eight hundred, in allowances of eighteen shillings a week; and to this must be added a good deal of expense in returning the nomadic masons to their homes.

The struggle has become one of peculiar significance from the evident determination of both sides to make it a test. The masons proclaim that they are in no danger of lack of funds to carry it on. The masters persist, for they have apparently concluded that they must bear their present losses unflinchingly, and hold their own now, lest worse things follow. The introduction of foreign workmen gives the fight a wider interest than any that preceded it. The masters are trying the last device that is left them for gaining an advan-

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tage over their men: if this proves ineffective they have nothing to fall back on, that we see, but a mere struggle of endurance. It has imported the question of free trade in labor just when the condition of the export market is beginning, it is said, to shake the allegiance of British manufactures in the traditions of this generation. But both tradition and immediate interest here engage the capitalist to maintain the established policy of free trade. How much of a resource the importation of workmen will turn out to be in practice, it is difficult as yet to say. It cannot be supposed that the masters will be able to use it on a scale sufficient at any time to "swamp" the native workmen, and make themselves independent of them, or to hold out against them if they are permanently and firmly banded together throughout the kingdom. On the other hand, it may prove sufficient to turn the scale in contests which without it would be pretty evenly balanced. A late report is, that the masons had agreed to propose a meeting for compromise, and that the masters had refused it. If the masters have absolutely, as they claim, made their contracts on such terms that they cannot pay the increase which the men demand, we may expect them to hold out obstinately. That workmen cannot continue indefinitely paying out money, and making none, is plain. It remains to be seen how long the masters will bear the strain. Already we read of some unexpected results of the controversy, which will probably please neither party to it. German contractors have offered, it is said, to come to England with their own men, and undertake contracts there, putting themselves and their men under the protection of the German consul. Whether the protection of the consul would shield them from the danger of having their men enticed away by the strikers is questionable, but interest and national feeling perhaps might. If this should become a habit we might see something like a revival of the old itinerant companies of mediæval free masons. Meanwhile the workmen have their own international unions, which are at least noisy: how powerful they may be, remains for them to show. But the foreign game is one that two parties may play at; and while the habit of striking is spreading both in Europe and America, and invading countries to which it was strange not long ago, it is not likely that effort will be wanting to unite the bands of discontented workmen in general movements. There is a possibility, greatly to be deplored, that their desultory struggles may turn into a general warfare of class against class.

THE CHURCH ARCHITECTURE THAT WE NEED.[1] — II.

FROM the subdivision of the empire of Charlemagne in the ninth century until the eleventh century, during which period architecture was entirely controlled by the ecclesiastical orders, no marked change or progress is to be noted. But with the franchises gained by the communes in the eleventh century, independent societies of artisans sprang into existence, and a new impetus was suddenly given to church architecture. The new state of society required churches in harmony with the new ideas, — more spacious and less gloomy.

The semi-circular form of arch used by the Romans in their barrel vaults, their groined arches and domes, offered great difficulties in their adaptation to the complete system of vaults occurring in the mediæval church. Their ponderous weight, too, requiring massive piers and walls of great thickness, was altogether inconsistent with the requirements of the problem now to be solved, viz., the vaulting of a vast space on a given plan, virtually that of the basilica, in a substantial, economical, and artistic manner. This difficulty was overcome by Suger in 1140 at St. Denis, where for the first time the ogive arches, heretofore employed only decoratively, were used constructively, they being here used as ribs or stone centres, subdividing the space to be vaulted into compartments, which were covered in by independent vaultings of lighter material resting on these ribs, which formed a skeleton frame of the vault. The thrust of these various ribs and arches was most scientifically resisted by counter-thrusts, securing a perfect equilibrium. By thus subdividing the vault into compartments and reducing the supports to independent piers, and by the use of the ogive and pointed arches, spaces of any shape in plan could be vaulted over with comparative ease, and perfect freedom in planning was obtained.

This radical change in the method of construction led to corresponding modifications in the artistic treatment of the design. Owing to the extreme lightness thus attained in the construction, the massive Romanesque piers which encumbered the interior, and rendered it dark and gloomy, were replaced by lighter ones, needed only for the support of the superincumbent weight; the thrust of the vault being now counteracted by a system of flying buttresses extending outside and over the aisles to vertical buttresses surmounted by pinnacles, leaving the space clear below. The galleries over the aisles, at first retained, were generally omitted in the thirteenth century, the triforium alone intervening between the aisles and clerestory, the interior thereby gaining in stateliness. But perhaps the most striking alteration grew out of the vast importance now given to the window openings. The comparatively small Romanesque windows were gradually enlarged until finally the entire side walls between the piers were done away with, and replaced by stained glass, the superstructure being supported by discharging arches over the openings, subdivided by mullions, with an endless variety of tracery above, while the glorious rose-windows illuminated the west end and the transepts. By these and other changes the massive and gloomy Romanesque church of the eleventh century was transformed into the more elegant and brilliant cathedral of the twelfth and thirteenth centuries, during which period the cathedrals of Paris, Chartres, Rheims, Amiens, Rouen, and many others, were erected in France, where the Gothic style originated, which was destined to supplant for a time all others in western Europe.

When the scholastic mind of Italy, during the sixteenth century, returned with zest to classic literature, it naturally led to a resumption of classic architecture, particularly as the Gothic style had never obtained a strong foot-hold south of the Alps, where the soil was covered with monuments of antiquity, before the grandeur of which all their modern works were dwarfed into insignificance. This return to the glories of the past spread rapidly through Europe, where the influences of Rome were everywhere strongly reflected. The same result was more particularly brought about in the North by the Reformation, and the consequent revulsion of feeling regarding every thing appertaining to the power of the priesthood; while the art of printing opened a new field to the laity, and closed, as it were, the records which had been written up to that time on pages of stone in the sculptures and decorations of the Church. With the return to the classic treatment, now called the Renaissance, the basilica type, still adhered to, assumed once more in some degree its primitive simplicity; but, unfortunately, the idea that the introduction of the classic orders on a large scale would be productive of a corresponding effect proved a fatal mistake, especially in the interiors, where the laws of proportion governing the orders necessitated the introduction of details of such magnitude as to produce a contrary result. This is fully exemplified in St. Peter's, Rome, which, in spite of these defects, offers, in the grandeur of its vault and the majesty of its dome, the most sublime interior in existence, due to the colossal mind of Michael Angelo, and which has served as a type for centuries.

In the early part of this century the unfitness of the prevailing church architecture to the wants and requirements of Protestant worship was so universally recognized that it led to the so-called "revival in church architecture;" and in the desire for a radical change, mediæval architecture, which appeals so strongly to the religious sympathies, was deemed the only style to be employed; and as in the sixteenth century, when the Gothic style was abandoned for the Renaissance, the latter in its turn, after three centuries of trial, was destined to a similar fate. Great efforts were made to revive the glories of the past; and while much praise is due to those who have devoted their lives and talents to the arduous task of rescuing from oblivion those grand landmarks of Christianity, and in reproducing them, their efforts have only been crowned with partial success, for although great strides have been made in religious art generally, but little has been accomplished in the matter of fitness of plan. The Basilica still universally adhered to, and admirably adapted to the wants of the Romish Church of the thirteenth century, proves to be ill suited to Protestant worship at the present day. Its piers subdividing the nave and aisles offer insurmountable difficulties, — a radical objection, whether treated in the Romanesque, Gothic, or Renaissance style; and has led not unfrequently of late years to the total abandonment of this type in favor of the galleried churches, where all ecclesiastical character is sacrificed to the accommodation of the congregation.

Having thus briefly sketched the history of church architecture, it may be well to suggest some of the needs and requirements of the Protestant Episcopal Church, which may be summed up as follows: First, worship and instruction, the two ends for which the church is to be reared, should be well considered in the condition of the structure. Second, dignity and repose should characterize all religious edifices, while the "house of prayer" should appeal to our sense of awe, lifting the thoughts from the finite to the infinite. Third, church architecture, of all others, should be truthful throughout in its arrangement, its construction, and decoration. The church should be so planned, that beside the proper and suitable provision for the officiating clergy about the altar and communion table, the congregation should be so accommodated that all may see and hear, and thus be enabled intelligently to take part in the services.

The various materials employed should be well selected and well adapted to their various purposes; and the construction to be satisfactory should be visibly sound, as well as in reality so

[1] A paper read at the Fourth Church Congress held at New York from Oct. 30 to Nov. 2, by Mr. Richard M. Hunt, F.A.I.A.

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The sister arts of painting and sculpture employed in the decoration should be so guided as to increase the monumental effect of the edifice, and fill the soul with religious emotion. Let us now consider first whether the above conditions and requirements are satisfactorily met and solved in the basilica; and, second, what improvements or alterations, if any, suggest themselves.

Among the advantages of the basilica plan are the numerous points of support, reducing thereby the space of the vault or ceiling, with a consequent reduction of cost. But what is of greater importance is the apparent height and length gained by reducing the apparent width, a feature of great importance, especially in Gothic work, as exemplified in the English and French cathedrals; the former being noted for their extreme length, while the latter are renowned for their excessive height. Among the disadvantages of the basillca type is the great length of nave necessitated where the congregation is numerous, offering an objectionable if not fatal feature oftentimes on account of the acoustic difficulties to be overcome, which are increased, of course, where the transept is introduced, and where the nave is carried to a great height, as in the Gothic treatment. That mechanical contrivance, the sounding-board, introduced over the pulpit, while it may overcome the difficulty to some extent, is a painful reminder of a defect. Its objectionable obtrusion mars the general effect, and makes one desire a more dignified remedy for the evil. The above objections in acoustics hold good in regard to the piers which in addition obstruct the view of about one-fifth of the congregation. The great difficulty experienced in overcoming this defect has led to various devices. The piers are sometimes diminished in numbers, being placed at greater intervals longitudinally, the effect of which, unless accompanied by a corresponding increase in the height of the nave, is detrimental, reducing, as it does, the apparent height, thus giving a low and dwarfed appearance to the interior. Again, the piers at times are reduced in size, iron being used in place of stone where the nave vault and the clerestory are of masonry. Wooden supports are also employed where the vault and clerestory are abandoned, or where the latter is constructed in carpentry, and the former replaced by apparent timber-work, or ceiled in. Now, while these devices only afford a partial remedy (for still they obstruct the view of many), they tend to destroy the architectural effect by their thin, attenuated look; and though the structure may be in reality stable, it no longer has the appearance of being so, — an absolute essential of all good work. Again, the change of material from stone to iron or wood gives the structure a cheap look, incompatible with, and destructive of, all dignity, — a most important element.

In conclusion, it appears that the attempt to adapt the basilica to the wants of the Protestant Church has generally failed, for where satisfactory accommodation has been secured, architectural effect has been sacrificed; and on the other hand, where the architecture has been noble and satisfactory, it has been at the cost of great inconvenience to the congregation. The difficulties and objections increase with the size of the structure, the type itself, with its nave and aisles and subdividing piers, being radically defective. In fact, if, as is so often asserted, the church problem of the thirteenth century was most satisfactorily solved, it hardly can be suited to our present wants, as formerly besides providing for the clergy about the altar, the one essential requisite was to impress the mind of the laity with mystery and awe; while with the change of ritual, and now that it is deemed wise and expedient for the congregation to see and hear all that transpires about the altar, the conditions are changed, the great desideratum now being an unencumbered space about the altar. This, when considered from a constructive point merely, offers no difficulties, as there is no actual need of piers or columns for support, as demonstrated in the many vast structures of the present day. But while with their disuse the problem might be practically solved, still it would often be at the sacrifice of proper artistic treatment, especially in works of great dimensions.

Much can be done towards overcoming the objection to the employment of columns, by placing them farther apart, or by keeping them near the walls; in the latter case, the objection is totally removed; but in the former, where the bays are enlarged, there is a tendency to destroy the scale of the building by lessening its apparent size. This can be remedied in a degree, however, by introducing secondary features, such as subdivisions in vaultings or ceiling compartments, grouping of windows, minor arcades, etc.

Let us now consider what may be suggested by existing examples, where almost every form in plan is to be found. The circular shape — perhaps the first to suggest itself, and which is most grand in its unity, especially where the dome is employed — unfortunately proves deficient at times, on account of the reverberation of sound. This defect, however, disappears when it is combined with other forms, as where a chancel or other adjunct is introduced. These remarks apply likewise to the various forms allied to the circle, namely, the hexagon, the octagon, the ellipse, and the vesica. The oblong plan without aisles, so commonly employed, is unobjectionable in churches of moderate dimension in so far as seeing and hearing are concerned. They are, however, perhaps a little monotonous, which defect can be greatly diminished by a judicial use of internal buttresses of slight projection, and by a skilful treatment of ceiling and wall surface. Closely allied to this aisleless type, is that where columns or piers separate the nave from the aisles, which are so reduced as to become passages merely — the sittings being confined to the nave. With this arrangement, the interior gains greatly in monumental effect.

In the more important structures of this class, where domes and vaults are employed, necessitating heavy buttresses to resist the thrust, they have been used both exteriorly and interiorly. In the latter case, they are sometimes objectionable, as by their projection they obstruct the view of the windows in the clerestory. This drawback disappears when the buttress is used on the outside, and carried over the aisles, leaving the space clear underneath; or where the clerestory windows are omitted, and the interior is lighted from above, as when domes are employed. Precedents are not wanting of the oblong type of church of immense size; but on account of acoustic difficulties, where great space is required, the cruciform shape — produced by the introduction of transepts — is preferable, as the length of the nave is thereby reduced, and the worshippers are brought nearer the chancel. This symbolical form, so appropriate and so universal, affords also the advantage of great variety of perspective effect, and permits endless modes of treatment both with the rectangular and apsidal termination of the arms of the cross, and is especially striking when the lantern or dome accentuates the crossing; and the nearer we approach to the Byzantine type, where the church becomes square in plan, and the Greek cross replaces the Latin, the more nearly we arrive at the desired solution. In fact, the Byzantine church, without doubt, presents superior advantages over all other types for Protestant worship, for in addition to the vast unencumbered space below, the deep recessed galleries above here become integral parts of the construction, and instead of being a blemish, as in other styles, add to the interior effect, their smaller features contrasting with the vast expanse of the arches above, whereby the scale is increased, while the broad wall surfaces and the majestic dome combine to render it in its unity impressive and monumental.

Finally, while much is to be gained by retrospective study, we should bear in mind that archæology is not architecture, and that it is much more essential that our architecture should be true rather than traditional. Real progress can be hoped for only in originality of ideas, and not by confining ourselves to servile copying.

THE ILLUSTRATIONS.

DESIGN FOR A PROTESTANT CHURCH.

We reproduce this design from the *Croquis d'Architecture* of the *Intime Club*, as it shows at once the character which Frenchmen think should be given to a building intended for Protestant worship, and also the freedom with which the students of the *École des Beaux-Arts* are allowed to treat the orders, and classic details.

SOLDIERS' MEMORIAL CHAPEL, AKRON, O. MR. F. O. WEARY, ARCHITECT.

GARDENER'S COTTAGE FOR MR. J. CAREY, JR., NEWPORT, R.I. REMODELLED BY MESSRS. STURGIS AND BRIGHAM, ARCHITECTS.

In this design the architects have made no change in the internal arrangement, the work consisting entirely in the treatment of the exterior. The house was originally a plain square structure, with a pitched roof.

WOODEN MANTEL.

This sketch presents a mantel-piece in an old house at Fort Hamilton (on the Narrows), New York Harbor. The exact date of the construction of the house is not known, but it was built somewhere near the end of the last century, and the mantel was evidently made at the same time. It is of wood, painted white. The mouldings are quite elaborately carved, and are in good preservation, though numerous coats of paint have rather dulled the sharpness of the carving.

HOUSE OF H. SOULE, ESQ., SYRACUSE, N.Y. MR. ARCHIMEDES RUSSELL, ARCHITECT.

This house, which is but lately finished, is built of the best front brick. The total cost was about $12,000.

CORRESPONDENCE.

THE WORK OF ENGLISH ARCHITECTS ON THE CONTINENT. — SWISS BARNS.

PARIS.

One cannot fail to be interested in all efforts to develop modern architectural effects from the primitive forms which the necessities of climate and material impose upon the peasants in each country; for, in studying these types, every country less readily falls into unreasoning imitation of its neighbors, and more intelligently produces a characteristic architecture. I have among my sketches an interesting example of such an effort in a picturesque little chalet just built in the Engadine Valley, Switzerland, by an English architect. He seems to have successfully found a refined, artistic expres-

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sion for those rude Swiss *châlets*, which, niched like bird-boxes in the remotest crags and valleys, represent a simplicity of construction within the unaided powers of the peasant, who, however, guided by centuries of tradition is rarely content with the strict necessities of shelter. It is curious how the poorest peasants in nearly all old countries gladly follow traditional embellishments, originated perhaps by some village genius, or little by little growing out of longings for the beautiful through many generations. Certain it is, that there are few European countries where even the poorest, if untainted by city influences, do not amaze the money-making spirit of to-day by many ornamental devices quite unjustified by their means. The German and Austrian *châlet*, with which we are familiar in the toy wooden models, has lost its original robustness, and has in its cardboard character caught something of the prevailing German tendency to dryness of design, the fault of the corresponding virtue, — the pursuit of refinement. But in the example of which I speak, the open-cut wood-work, which used in profusion gives a flimsy character, is kept so subordinated that it gives the main construction additional solidity. The *châlet*, on the edge of a steep descent, and admirably planned for the view up and down the valley, is in the form of a cross; for the four gables project enough to be virtually wings, and give opportunity for sheltered balconies. The whole effect is most picturesque, though the varying height of the gables makes an unnecessary complication in the construction.

After the manner of the primitive *châlet*, where the rough logs projecting across the corners are notched together to give firm bearing, the walls are made of the thickest planking halved together at the angles, projecting across several inches, and at top and base with much greater projection profiled into suggestions of dragons' heads, etc. An idea suggested in the peasants' houses of the Engadine, where there is, in spite of a rigorous climate, much interest in flower-culture, has been gracefully treated in breaking the usually stiff lines of the balconies by corbelling out from the front hand-rail another miniature balcony or gallery for flower-pots. The interior is of course carefully sheathed and protected against the exposed cracks of the outer planking, the windows only being surrounded by frames with ornamented edges. I will only add that the exterior, left unpainted, has already taken a rich brown tint, and is decorated with quotations and epigrams after a fashion still existing on the southern slope of these mountains. I write these details with some minuteness, thinking that in our country, subject to heavy snow-falls, and employing much wooden construction, the *châlet*, as an ancient type in countries of similar peculiarities, should be of special interest; and that it has not had justice done to it heretofore, this decided renaissance of its best features is a proof.

The barns in the Engadine region are highly monumental, and are so arranged as to admit as much air as possible. Why the hay should be thus greatly exposed to the weather, I could not discover, as my inquiries of the farmers were met by a look of surprise, and the dogmatic statement that hay should be always open to the air. Whether this is an unreasonable tradition, or whether more probably in a land of long, dark winters, the hay moulds easily, or is otherwise injured by dampness, I must leave to some of our travelled farmers to decide. Whatever the *rationale*, it lends itself to a good architectural effect. In the simplest of these constructions, piers of masonry support the deeply projecting roof, and the sides are filled in with boarding spaced two or three inches apart; in the more pretentious, the walls are composed of two or three great arches closed with woodwork pierced in patterns; and, as many of these barns are very large, the lofty arches often enclosing two stories, the effect of the white masonry and the brown wood pricked through with the black open-work is fine. I have seen some modern adaptations of this idea for freight-houses.

Another building creditable to English art in foreign lands is a little chapel at Baveno. Here on the lovely shores of Lago Maggiore, Mr. Henfry, a wealthy Englishman, lives in a sumptuous villa, and has lately added to the attractions of charming gardens and terraces this exquisite private chapel. The architect, Mr. Pullan of London, has had an opportunity, here in the midst of Italian scenery, to design a monument appropriately rendered in his favorite Byzantine style; and the result is such as almost to justify that exclamation of enthusiasts, "a gem of architecture." The building, which contains about fifty comfortable chairs, is an octagon, surrounded by an aisle with eight monolithic columns, supporting the central structure, or lantern, with its low clerestory and steep pitched roof. It has two entrances with porches, — one for the family, and one facing the path by which the cordially invited strangers approach to the daily service. The other sides are occupied by round-arched triplet windows, with black oiled shafts in the jambs, and by the apse of the chancel. The gray stone exterior bears, in its quiet simplicity, the impress of a building for private devotion. It is in the interior that one is first deeply impressed by the perfect harmony of the elaborate decoration, of which I can only pretend to give the general scheme of color; as a description of the intricate development in details would be hopelessly confusing. From a dado of cold gray marble, the eye glides over walls of a cool yellow tone, banded in pale gray courses with unobtrusive patterns, up to a frieze of geometrically decorated squares of red and blue. Wherever one may look, this frieze, being of a decidedly marked coloring, — all below being paler and cooler, and all above darker and warmer in tone, — insensibly carries the eye around to the chancel-apse, where the intensity of the frieze is absorbed in similar coloring, more intricately developed. The whole, however, is so full of fine movement in graceful scroll and leaf decoration, as well as so complex in color, that the eye is charmed, and with difficulty, as in all good compositions, analyzes the carefully controlling scheme of decoration. The roof of the aisle, as well as of the lantern, is of a reddish color, the natural tint of the oiled wood, and makes a fine ground for the colored scrolls and foliage. The space between the windows of the apse and the frieze is filled with a graceful choir of white-robed angels, unfortunately on a gold ground, which does not add to the general solemnity of the apse as a darker one would have done. These figures, as well as those in the appropriate windows by Clayton and Bell, are, of course, of small size, and well in the scale of the building. As a whole, the decoration is eminently successful in combining a light, airy tone with rich harmonies of color, and the costly marbles and sculpture at the command of the architect are judiciously employed.

Mr. Henfry assured me that Mr. Pullan designed all the great variety of details in scrolls and patterns without reference to documents, as he only worked them up as they were needed for the workmen, being at the time a guest at the villa, having come with only a portmanteau. Who would not covet such an Arabian-Night sort of box! Mr. Henfry also told an anecdote which is characteristic of the intensely British spectacles through which your loyal Englishman sees the world. The columns of the porches are supported on the backs of the traditional lions often thus used in Northern Italy; and an Englishman, after carefully examining them, was heard to remark that he should think the owner, being a blooded Englishman, and opening the chapel to his country-people, might have been patriotic enough to have supported his columns on a lion and a unicorn. R.

STEWART'S WORKING-WOMEN'S HOTEL.

NEW YORK.

IT would require a middle-aged New Yorker to recall the date of the beginning of work on Stewart's Working-Women's Hotel. Records show that it was started between ten and twenty years ago, and has been crawling to completion ever since. At times work was brisk, and hundreds of laborers and artisans pushed the work along. At other times, often for months together, the great iron cage was left to the care of the keepers. There were no changes of plan from the original design prepared by the late John Kellum, whose inflictions upon New York in the several Stewart piles and the County Court House recall Shakspeare's lines upon the evil which is not interred with men's bones. A. T. Stewart too has gone, and among the many *quasi* successes of his life, those connected with matters architectonic find a type in this Women's Hotel. Everybody has seen it, as it stands in all its iron rendering of Italian Renaissance, frowning down upon the thousands of travellers from the north and east, as they emerge into the lower section of the city from the Fourth Avenue tunnel. Of all the innumerable examples of this common style of the use of iron in street fronts, it is the worst, because it is the largest and the most pretentious. It is well built, well furnished, substantial, and in its purpose and intent of providing an eating and sleeping place for a thousand working-women, should in all material aspects serve admirably; but artistically it is a magnificent failure, a two-million-dollar example of what New York does not want if she is ever to show a decent architectural face along her principal thoroughfares. The recent opening of the building to the uses which its founder had in view calls public attention to it, and makes it worth while to give a general description of it.

It is situated on Fourth Avenue, with a frontage of 196 feet 6 inches, and runs back on Thirty-second and Thirty-third Streets respectively 205 feet, covering a total area of over 40,000 square feet. It is six stories high with an additional mansard story, and along the front for a width of 100 feet the mansard is raised a story, making in this portion an eight-storied building above the curb. Nothing is seen exteriorly but iron, glass, and slate. The height from sidewalk to the main cornice (six stories) is 90 feet. The mansard adds 12 feet, while over the central portion of the front the external height to the mansard curb moulding is 109 feet. The main entrance is on Fourth Avenue, and is 48 feet in width, and is emphasized by a two-storied portico, with clustered iron columns; and an attempt at lightness has been made in this feature, which only makes it the more out of keeping with the heavy mass to which it is attached. The block plan shows an inner court 94 x 116 feet, at the centre of which a fountain with basin 18 feet in diameter will be placed. In addition to this, several ventilating shafts 8 x 10 feet are provided. The vestibule within the grand entrance is very roomy, and leads to a hall 30 feet wide, from which the main staircase rises with double flights, and between them runs the largest elevator: there will also be two other passenger-elevators, with a pair of freight-lifts at the rear end of the building. The first story, 19 feet 6 inches in the clear, will be fitted up as stores; of these there will be twenty-four, each 52 x 17 feet. The basement floor is 14 feet below the sidewalk, and will be given up entirely to the engines and furnaces. Vaults for coal extend below the sidewalks on the

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three sides of the hotel, while a dozen or more boilers will furnish the steam for heating the entire interior, for driving the elevator engines, for furnishing power to kitchen and laundry, and for working the ventilating fans, as well as pumping water to the two great water-tanks each of 13,000 gallons capacity, situated in the mansard story. From these tanks the entire water supply for the upper part of the building will be drawn. In the rear of the first floor, the laundry and kitchen are arranged; and if report be true some wonderful quantities of provender are to come from the regions of the *chef*. Some idea may be formed of the scale of preparation when for griddle-cakes alone an iron griddle 7 x 13 feet and one inch thick has been set. This expansion of the kitchen facilities is because of a plan of giving out lunches and ready-cooked dinners to girls and others not living as guests in the hotel; and for this a room 50 x 20 feet on the ground floor at the Thirty-second Street flank will be used. When in full working order it is calculated that daily meals may be furnished to 4,000 people. The second story of the building is 16 feet high, and will be given up to the common uses of the hotel occupants. Here will be the dining-hall, the grand parlor, the library and reading-room, and the concert or assembly room, each 55 x 100 feet. 600 guests may sit down to dine at the same time; and in the fitting up of the other apartments the utmost care has been taken to have the surroundings and furnishing on a scale of elegance and cost commensurate with the size of the whole. These rooms with the other private parlors and rooms on this floor look into the inner court, and open as well upon the outer streets. The passages and halls of the first and second floors will be tiled in marble, but the rooms proper will be carpeted; and over 15,000 yards of Axminster, Wilton, and Brussels have been used in the several rooms throughout the building. The third, fourth, fifth, sixth, and seventh floors are cut up for the uses of the lodgers. There are 502 private rooms; of these 115 are double rooms, each 16 x 18 feet area, while the 387 single rooms are of half this size. All are furnished in good style, and each room has hot and cold water-taps, gas, and electric bell communication with the office. Bath-rooms and water-closets are provided in abundance. In all respects the building represents the best material, put together with the best workmanship. The building is technically fire-proof; that is, it has heavy brick bearing walls, iron beams, filled in with brick arching and overlaid with cement bedding for tile or hard-wood flooring. The partition walls are built with iron studding, iron laths, and plaster. The bald cold look of the interior is relieved as far as possible by a judicious use of works of art, and the arrangements will compare more than favorably with the best hotels in the country. Altogether the pile is a magnificent monument. If the plan of gathering together a thousand irresponsible young women into a single home shall meet permanent success, the Stewart Home will be a blessing.

MR. RUSKIN'S APHORISMS ON DRAWING.

MR. RUSKIN has at length published the first part of his new book on art, under the title of "The Laws of Fiesole: a familiar treatise on the Elementary Principles and Practice of Drawing and Painting, as determined by the Tuscan Masters." It contains the following series of general aphorisms, which Mr. Ruskin wrote for a young Italian painter, as containing what was likely to be most useful to him, in briefest form:—

I. — The greatest art represents every thing with absolute sincerity, as far as it is able. But it chooses the best things to represent, and it places them in the best order in which they can be seen. You can only judge of what is *best*, in process of time, by the bettering of your own character. What is *true*, you can learn now, if you will.

II. — Make your studies always of the real size of things. A man is to be drawn the size of a man, and a cherry the size of a cherry. "But I cannot draw an elephant his real size." There is no occasion for you to draw an elephant. "But nobody can draw Mont Blanc his real size." No; therefore nobody can draw Mont Blanc at all, but only a distant view of Mont Blanc. You may also draw a distant view of a man, and of an elephant, if you like; but you must take care that it is seen to be so, and not mistaken for a drawing of a pigmy, or a mouse near. "But there is a great deal of good miniature-painting." Yes, and a great deal of fine cameo-cutting. But I am going to teach you to be a painter, not a locket-decorator or medallist.

III. — Direct all your first efforts to acquire the power of drawing an absolutely accurate outline of any object of its real size as it appears at a distance of not less than twelve feet from the eye. All greatest art represents objects at not less than this distance, because you cannot see the full stature and action of a man if you go nearer him. The difference between the appearance of any thing — say a bird, fruit, or leaf — at a distance of twelve feet or more, and its appearance looked at closely, is the first difference also between Titian's painting of it, and a Dutchman's.

IV. — Do not think, by learning the nature or structure of a thing, that you can learn to draw it. Anatomy is necessary in the education of surgeons; botany in that of apothecaries; and geology in that of miners. But none of the three will enable you to draw a man, a flower, or a mountain. You can learn to do that only by looking at them, not by cutting them to pieces. And don't think you can paint a peach because you know there's a stone inside, nor a face because you know a skull is.

V. — Next to outlining things accurately, of their true form, you must learn to color them delicately, of their true color.

VI. — If you can match a color accurately, and lay it delicately, you are a painter; as, if you can strike a note surely, and deliver it clearly, you are a singer. You may then choose what you will paint, or what you will sing.

VII. — A pea is green, a cherry red, and a blackberry black, all round.

VIII. — Every light is a shade, compared to higher lights, till you come to the sun; and every shade is a light, compared to deeper shades, till you come to the night. When, therefore, you have outlined any space, you have no reason to ask whether it is in light or shade, but only of what color it is, and to what depth of that color.

IX. — You will be told that shadow is gray; but Correggio, when he has to shade with one color, takes red chalk.

X. — You will be told that blue is a retiring color, because distant mountains are blue. The sun setting behind them is nevertheless, farther off, and you must paint it with red or yellow.

XI. — "Please paint me my white cat," said little Imelda. "Child," answered the Bolognese professor, "in the grand school all cats are gray."

XII. — Fine weather is pleasant; but if your picture is beautiful, people will not ask whether the sun is out or in.

XIII. — When you speak to your friend in the street, you take him into the shade. When you wish to think you can speak to him in your picture, do the same.

XIV. — Be economical in every thing, but especially in candles. When it is time to light them, go to bed. But the worst waste of them is drawing by them.

XV. — Never, if you can help it, miss seeing the sunset and the dawn. And never, if you can help it, see any thing but dreams between them.

XVI. — "A fine picture, you say?" — "The finest possible: St. Jerome, and his lion, and his arm-chair. St. Jerome was painted by a saint, and the lion by a hunter, and the chair by an upholsterer."

My compliments. It must be very fine; but I do not care to see it.

XVII. — "Three pictures, you say? and by Carpaccio!" — "Yes, — St. Jerome, and his lion, and his arm-chair. Which will you see?" — "What does it matter? The one I can see soonest."

XVIII. — Great painters defeat Death — the vile adorn him, and adore.

XIX. — If the picture is beautiful, copy it as it is; if ugly, let it alone. Only Heaven and Death know what it *was*.

XX. — "The King has presented an Etruscan vase, the most beautiful in the world, to the Museum of Naples. What a pity I cannot draw it!"

In the mean time, the housemaid has broken a kitchen teacup; let me see if you can draw one of the pieces.

XXI. — When you would do your best, stop the moment you begin to feel difficulty. Your drawing will be the best you can do; but you will not be able to do another so good to-morrow.

XXII. — When you would do *better* than your best, put your full strength out the moment you feel a difficulty. You will spoil your drawing to-day; but you will do better than your to-day's best, to-morrow.

XXIII. — "The enemy is too strong for me to-day," said the wise young general. "I won't fight him; but I won't lose sight of him."

XXIV. — "I can do what I like with my colors now," said the proud young scholar. "So could I, at your age," answered the master; "but now I can only do what other people like." — *The Architect.*

THE WORD "OBELISK."

BOSTON, 19 Nov., 1877.

TO THE EDITOR OF THE AMERICAN ARCHITECT.

Dear Sir, — In your paper of the 3d inst. in a mention of Mr. I. C. Markham's design for a monument on the battle-field of Saratoga, you speak of it as "an octagonal obelisk," etc. Mr. Richardson, in his description of Trinity Church in this city, writes: "The composition took the outline of a pyramid, the apse, transepts, nave, and chapels forming only the base to the obelisk of the tower."

Surely, in both these instances, the term "obelisk" is misapplied; for what say the dictionaries? —

"A four-sided shaft of stone, tapering and truncated."

"A quadrangular pyramid, very slender and high."

SIGMA.

[Our use of the expression "octagonal obelisk" was by a metaphor which perhaps we should not have risked if we had expected to be brought to book. The characteristic that distinguishes an obelisk from a slender square pyramid is its ending at the top in a pyramid of lesser pitch. It is this peculiarity that most distinguishes Mr. Markham's design from a Gothic spire (a very good point in the design, too), while in its plan the square so predominates over the octagon that it really is an obelisk with all its edges chamfered except the horizontal ones. — EDS. AMERICAN ARCHITECT.]

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NOTES AND CLIPPINGS.

WATER-TANKS IN FACTORIES. — Hereafter the Superintendent of Buildings in New York will require all owners or occupants of buildings used for manufacturing purposes, to have on each floor above the first, a tank of five hundred gallons capacity, continually filled with water, and to attach to it the necessary appliances for extinguishing fires.

THE BLACKWELL'S ISLAND BRIDGE. — Fears have been entertained that the recent embarrassments of the Long Island Railroad would delay the building of the proposed bridge over the East River, at Blackwell's Island. R. M. Graham, secretary of the bridge directors, states that the work will not be delayed on account of these troubles. Herman Poppenhusen is the only member of his family interested in the bridge, and he owns about ten thousand dollars of stock. Mr. Graham says, however, that nothing will be done in connection with the bridge until there is a change in the board of directors.

HARTFORD DECORATIVE ART SOCIETY. — The committees of the Decorative Art Society of Hartford have had their first meeting for this fall. Various ways of promoting the interests of the society were discussed, chief among which was a plan for securing thorough instruction in elemental drawing at a moderate price, so that any one desirous to lay a good foundation for future work could obtain this most necessary preparation. The matter has been placed in the hands of two of the committee, who are to report upon ways and means. A prize of $25 has been offered by the parent society in New York for a design for "painted decoration of a door," to be sent in before Dec. 1, 1877. No specifications have been given, and any style of decoration can evidently be sent in. All necessary information will be furnished by the secretary of the society.

THE WATER SUPPLY OF NEW YORK. — William Burdon, of Brooklyn, has sent a long communication to the Chairman of the Special Committee on Water Supply for the City of New York, in which he states, that by means of a close canal or conduit, beginning at the Harlem River, running through Westchester County, following the lowlands and keeping the depth below the well level, a supply sufficient for the future use of the city can be obtained. He says the canal would always be full of pure water, supplied from the great underground basin of Westchester, as it would intercept in its course all the springs and streams. He proposes to have one main conduit, beginning at a point west of King's Bridge, or east of Central Bridge, on the Westchester side of the Harlem River, running up through Westchester, with lateral branches right or left, as the nature of the ground may dictate, smaller ones to be built in each of the valleys, and a cross tunnel made to intercept them all, — the conduits to be extended according to the growth of the city. Mr. Burdon claims that with pumping wells on the New York side, connecting with a tunnel under the Harlem River, sufficient force would be gained to carry water to the upper floors of houses on Murray Hill. The cost of the works he estimates at $9,500,000, exclusive of the right way. He says the expense of pumping will not compare with that of building costly reservoirs on high elevations; and even if it did, the sanitary advantages would more than compensate.

THE METRICAL SYSTEM IN THE POST OFFICES AND NAVY. — The Postmaster-General, in reply to the House, says that the objections to making a metrical system of weights and measures obligatory throughout the postal services are two; viz., the expense incident to a change of systems, and second, apprehension that it may fail to give practical satisfaction, owing to a lack of knowledge of the system and experience in its use by many postmasters and by the public. He suggests that if Congress decides to extend the system to the entire postal service, an adequate appropriation should be made to supply all the post-offices with suitable scales and balances, and that six months be allowed before requiring its obligatory use. Twelve months would be ample time to obtain the supply; and in eighteen months after the appropriation is made, the new system could go into operation. The Secretary of the Navy sees no objection to the metrical system in the navy, except if applied to soundings given in charts, it would probably involve a total loss of all the charts and chart-plates now in use, and would be prejudicial to an exchange of charts with England.

RECLAIMING A LARGE SWAMP. — Bliss Sutherland, of Kankakee, Ill., is engaged in digging a ditch seven and a half miles long, from an eight-thousand-acre tract of swamp land in Newton County, Ind., belonging to Gaff, the Cincinnati brewer, to the Iroquois River, in the north-eastern part of Kankakee County, Ill. The ditch will be eighteen feet wide at the bottom, thirty feet wide at the top, and will be four feet deep. At one point in its course, where it intersects a sand-ridge one thousand feet wide, the ditch will be eight feet deep. Six miles of the distance is traversed after leaving Mr. Gaff's land. Besides this immense outlet, there will be thirty miles of ditching done on the eight thousand acres. The work will keep fifty to a hundred men employed all next season, and the cost will be over $30,000. At a cost of $4 per acre the land can be made worth $30, where it is now worth $2 or $3.

BRONZING IRON. — A bronze for iron is described in the *Deutsche Industrie Zeitung*. The articles to be bronzed are heated in the air after being coated with linseed oil. Objects which cannot be exposed to a high temperature may be steeped in a slightly acid solution of ferric chloride plunged into hot water, and when dry, rubbed with linseed oil or wax. The iron is then steeped in a solution of sulphate of copper for a few moments, and afterward transferred to a solution of hyposulphite of soda, acidulated with hydrochloric acid. The result is a blue-black coating, not affected by air or water.

BRIDGING THE FIRTH OF FORTH. — Encouraged by the successful completion of the Tay bridge, the authorities have decided to at once take steps to carry a bridge across the Firth of Forth.

THE NEW STATUE OF PRAXITELES. — The following from the London *Athenæum* is a statement of the discovery of a very important work of ancient Greek art. In the second week of May, 1877, there was found in the Olympia temple of Zeus, not far from a portrait statue of a Roman lady, a colossal marble statue of a nude youth. The lower portion of the legs and the right fore-arm are wanting. With the left elbow he leaned upon the stem of a tree, supporting on his arm a little boy. Of the latter figure, unfortunately only the lower part remains, and the tiny hand that he had laid confidingly on the shoulder of his bearer. Over the tree stem on which the arm that supports the boy is rested, falls the drapery in rich, deeply-cut and wonderfully worked folds, affording to the arm a soft resting-place, and gracefully hiding the support of the tree stem, which in this position was technically necessary. The body of the youth rests with an easy negligence on the left leg, so that the soft flesh of the right hip shows in manifold displacements the play of the muscles of the blooming youthful form. The head is marked by the finest, most spiritualized youthful beauty, and somewhat resembles the heads we see on the Vatican Meleager, or the Hermes of the Belvedere. The body, too, resembles those figures, only it is slenderer, softer, more vivacious. At the first glance, we are struck by the careless execution of the hair, which, in the parts that were usually unseen by the spectators, is only slightly indicated. The back of the statue is also less thoroughly wrought. Now Pausanias reports that among the gifts of a recent date was a marble Hermes carrying the boy Dionysus, and that it was a work of Praxiteles. The savants who have charge of the excavations have therefore, and there is no doubt correctly, inferred that our statue is really the Hermes of Praxiteles, and that we now, for the first time, behold an original work of that great artist, — a work that is equal to the greatest treasures we possess of ancient art, and which must ever remain a corner-stone of our knowledge of the history of Greek sculpture.

DISCOVERY OF AN ANCIENT CITY IN COLORADO. — A Colorado correspondent of the Chicago *Times* reports that a gold-seeker who was exploring the San Miguel and Doloros valleys in search of gold last year, discovered on the west bank of the Doloros river the ruins of what had once evidently been a large city. Ancient ruins and fragments of pottery were scattered in every direction, and the foundation walls of some of the principal buildings were still standing in a good state of preservation. In the centre of the ruins and standing in a clear open space, were the remains of a temple which had evidently been devoted to the worship of the sun. The walls were of hewn stone, and so closely laid together that it was hard to detect a joint. The plaster on the walls inside was still bright and fresh looking. The temple measured 300 feet in length and 120 feet in width, and the walls were adorned with rough representations of men and animals, with no perspective, while over one of the windows was the rude figure of a dove bearing a twig or branch of some kind, and flying toward a mountain in the distance. The explorer found the ground covered for acres with cut stones and broken crockery-ware, and houses and walls of solid masonry, showing marks of skilful workmanship, having withstood the ravages of time for unnumbered centuries. A wall fifty feet thick, apparently several miles in circumference, was visible in many places. In places houses were found completely covered in the earth. In one of these houses the explorer found an opening, and by means of a rope let himself down into what he considered the upper story of a building of enormous size. There were at least a dozen different apartments, some of them very large. The floor was of solid cedar logs, hewed and fitted close together.

ROMAN AMPHITHEATRE. — A Roman amphitheatre has been unearthed at Ventimiglia, near Nice.

THE DUOMO AT FLORENCE. — The façade of the Duomo at Florence, so long left unfinished, is at length likely to be completed, and the Pope has duly blessed the designs. His Holiness has given a beautiful mosaic of Raphael's "Madonna di Foligno" (now in the Vatican), to be placed in the Duomo.

COAL-DAMP. — The recent explosion at the colliery at High Blantyre, Scotland, has directed attention to the increasing danger from fire-damp in old pits. It has been suggested that some means should be devised for indicating at the mouth of a pit the condition of the air in any part of the workings. Fire-damp consists of three-fourths of carburetted hydrogen and of one-fourth of other gases. Three parts of fire-damp to one of air is not explosive; but it is liable to produce drowsiness in the miners, or even suffocation, and to cause the flame of a lamp to burn dimly or to die out for want of oxygen. When the fire-damp is diluted with fifteen to twenty times its volume of atmospheric air, the flame of a lamp burned in the mixture is very large and surrounded with a blue envelope. But if there are eight parts of air to one part of fire-damp, the introduction of a light will instantly produce a terrific explosion. It is not fire-damp alone which has caused so many terrible disasters in mines, but its mixture in a certain proportion with atmospheric air. As a means of indicating the condition of the air in any portion of the headings to those above ground, it would appear, therefore, that some combination of a barometer and an electric apparatus might prove of advantage. — *New York Times.*

THE AREA OF LIGHTNING-CONDUCTORS. — Professor Colladon insists that most of the metallic wires used as lightning-conductors on buildings are by far too slender. He says that they should be at least five hundred square millimètres in section, otherwise they are more likely to do harm than good.

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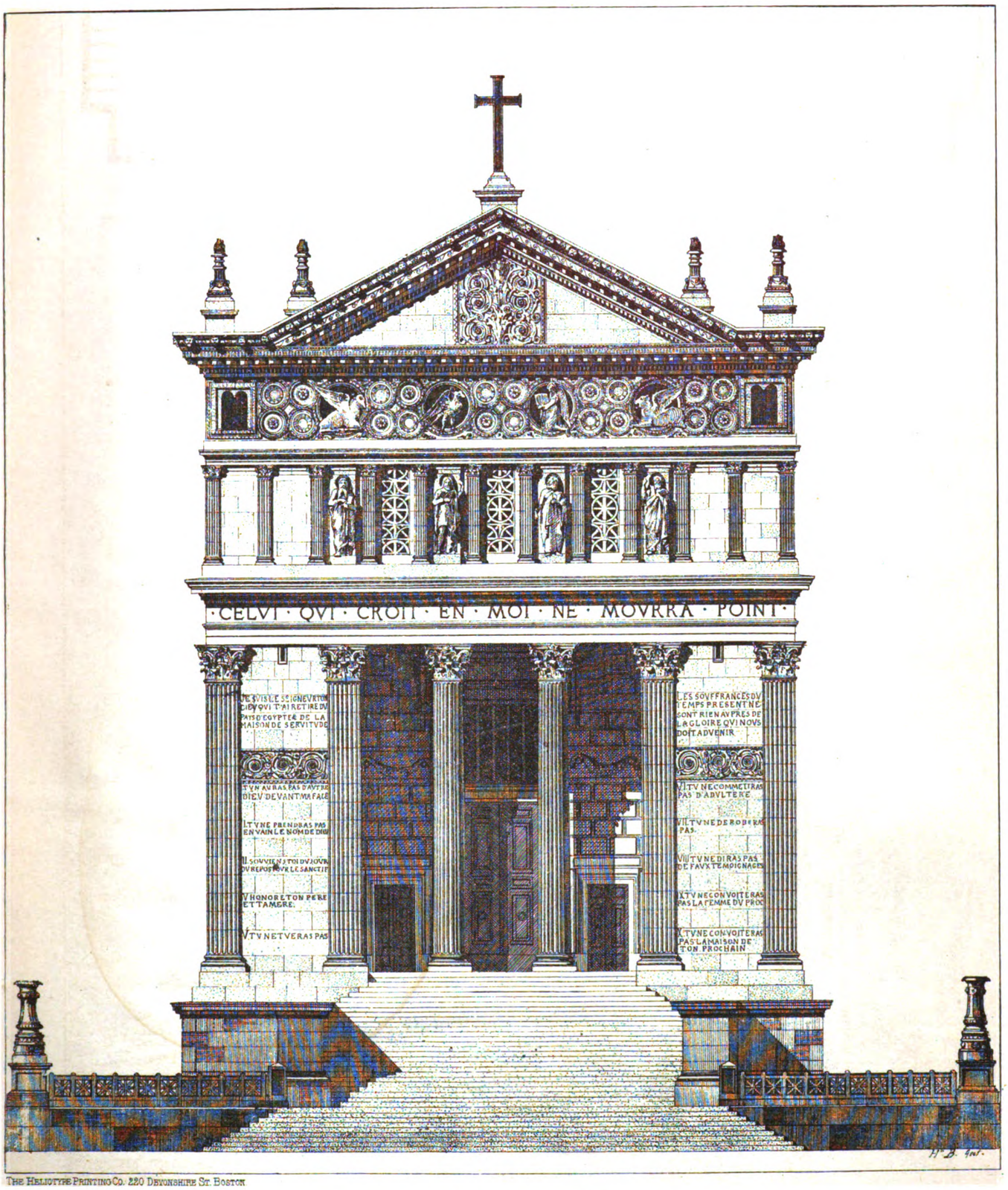

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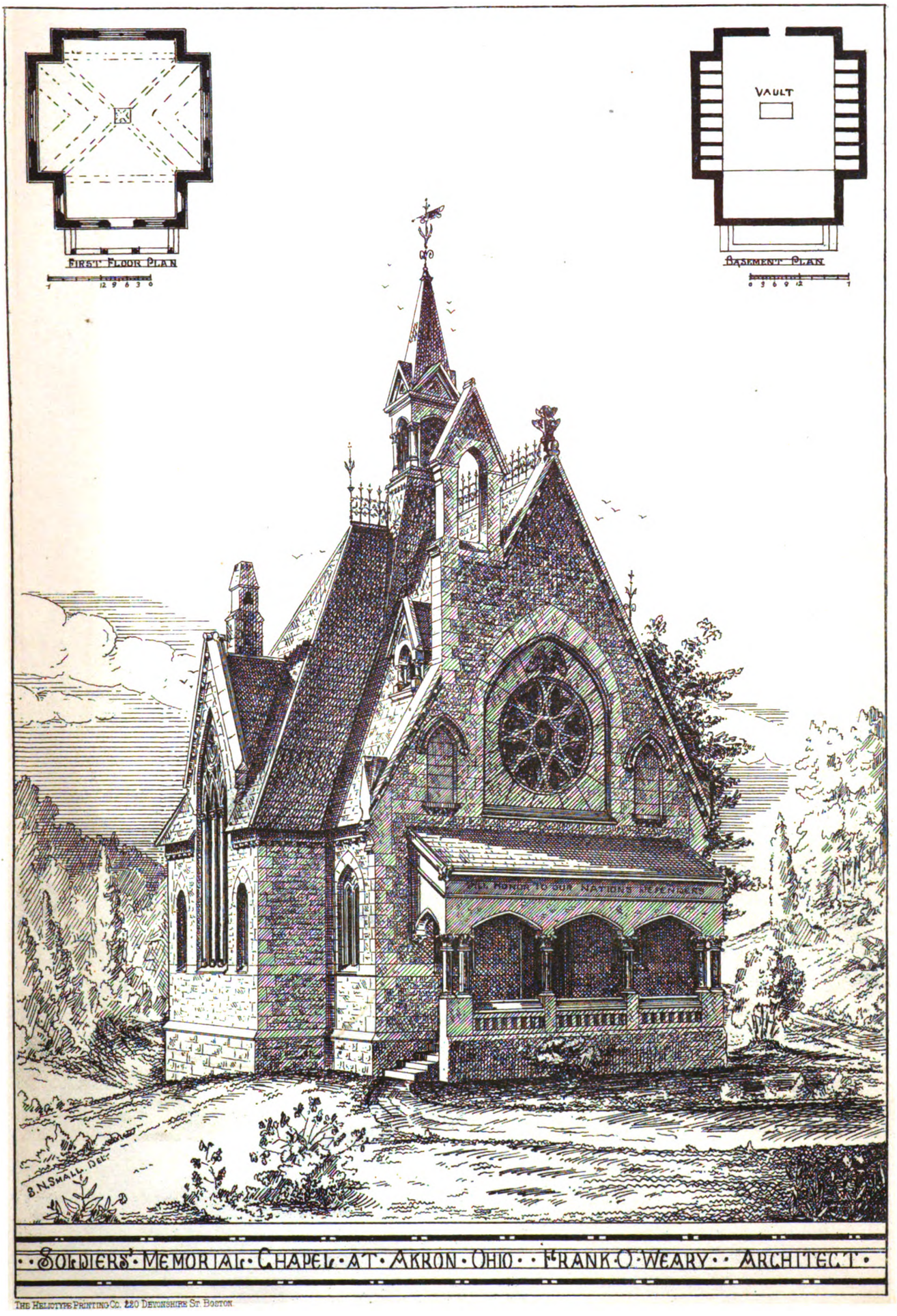

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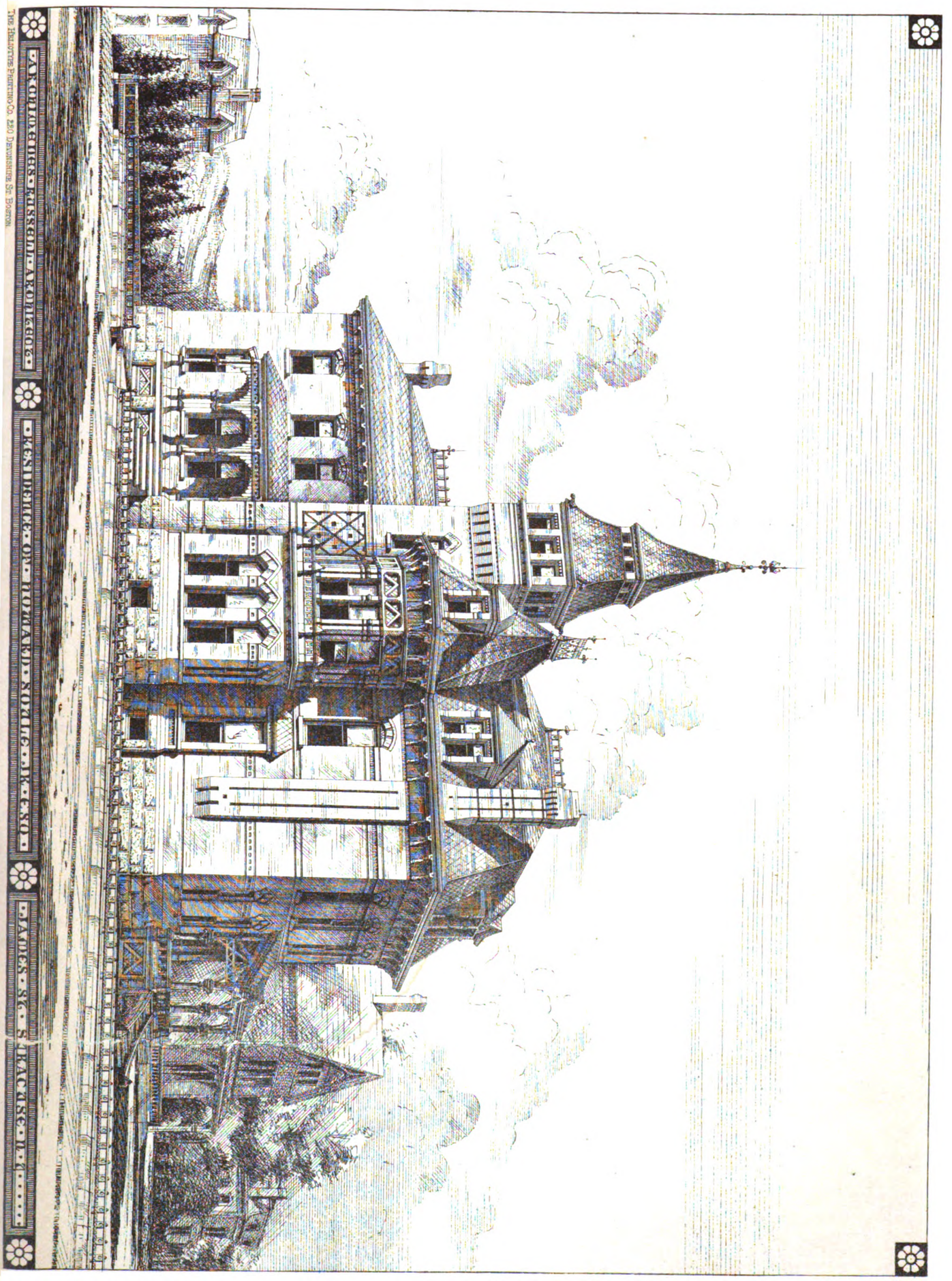

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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THE progress of the new City Buildings at Philadelphia has been for some time at a standstill, owing to the deadlock between the Commissioners and the city Councils. When the building was proposed, the State Assembly, it will be remembered, took the administration of it out of the hands of the city, and gave it to a permanent board of commissioners. The building, which was undertaken during the flush times that followed the war, on a scale of great splendor, has proved since times grew hard a heavy burden, and the Councils have of late refused to vote money for it. Of their refusal to lay the special tax appointed by the Assembly, which was to be levied on the requisition of the Commissioners, and of the suit of Messrs. Struthers, the contractors for the marble-work, for payments authorized by the Commission, with the decision of the court that the city was bound to honor the warrants of the Commission, we have given some account (*American Architect*, June 23 and 30, 1877). Since the discussion of last spring, the uneasiness of the tax-payers and the resistance of the Councils and the newspapers have continued and increased. The Commissioners have within a few days sent a communication to the Councils containing a report of the condition of the buildings, and have followed up their last two disregarded requisitions with another for the year 1878. At the same time the Messrs. Struthers, relying on the liability of the city for their as yet unfulfilled contract, seem to have gone on in spite of their unpaid warrants, furnishing marble which, as the city provides no money to set it, accumulates without being used. This time the Commission find that most of the press of the city is arrayed against them; and their reminder that they have bound the city to a contract for five and a quarter million dollars, of which three millions is yet to come due, is received with especially bad grace. "At present," says the *Press*, "when the treasury lives by disgraceful warrants, and tax-payers are disheartened by the depreciation of their property, there is only one thing to do, and that is to stop spending money needlessly." Views differ as to what is spending needlessly, and the Commissioners do not seem disposed to abet in not spending; so that it looks as if the only resource were a resort to the Assembly, which gave the city its charter and the Commissioners their authority. To this the newspapers are disposed to appeal, and wish to abolish the Commissioners.

THE Commission report that most of the first story, thirty-three feet high above the basement, is built, and the exterior faced with marble, as is almost all the interior court. The main entrances on the south and west are finished, and their stone ceilings protected by temporary roofs. The east entrance is nearly done, and the northern one begun. The whole contract with Messrs. Struthers is $5,300,000, of which $1.721,000 has been liquidated, partly with unpaid warrants; and if half a million is allowed for setting the marble, there remain still three millions which the city is bound to pay for the rest of the marble and cutting, whether it chooses to use it or not. The Commissioners' requisition for 1878 is: salaries and expenses, $33,750; brick-work, $190,000; iron-work, $107,500; marble-work, $650,000; cut stone for interior work, $188,000; and carpenters' and other work which makes up the amount to a million and a quarter, that is, about a dollar and a half *per capita* for the inhabitants of Philadelphia. The suspension of the work during this year, the Commissioners say, has done great damage to what has already been built. They have not had means either to continue the brick-work of the walls, or to protect what is done. The exposed brick-work has already been soaked with water to the depth of several courses, and is liable to great injury from the winter frosts. Much of the finely wrought stone-work of the entrances is unprotected. The Commissioners add that if their warrants had been honored during the last year to the amount of half a million dollars, many of the officers and departments of the city might have been provided for the coming year with quarters in the building.

THE *Chicago Tribune* has lately been making charges of over-measurement of the brick-work of the new Court House in that city, — which is now fairly under way again, after the long quarrel over it between the city and the county, and their several architects. This has drawn from the contractor, Mr. Sexton, a letter of defence, which the *Tribune* has the wickedness to print without the customary editorial emendation. We shall not attempt to weigh the merits of either attack or defence, which are not matters of general interest; but the letter contains statements which are worth noticing for the illustration they give of some of the evils of current practice. Mr. Sexton says, for instance, that his contract was first awarded for common brick laid in lime mortar, and every third course grouted, at a price of seven dollars (a little less) per thousand laid. Since, however, Mr. Sexton's estimate was much lower than had been expected, — some fifty thousand dollars lower than the average bid, — it was concluded that the County could afford to raise the quality of the work by substituting selected (sewer) brick for common, by using cement mortar, and by grouting every course, which, says Mr. Sexton, means the very best class of work, and for which an additional three dollars per thousand was allowed.

THIS gives one a queer idea of the kind of brick-work which the architect thought good enough, and which we may assume the County would have been willing in the first place to accept, for a great public building. Common brick, which always means the commonest, — and the bricks of Chicago are not of good renown, — were to be laid as workmen lay brick when they expect to depend on grouting; and then only one course in three was to be grouted. People who are used to old-fashioned thoroughness of work, and to seeing every brick carefully bedded and settled into place with the trowel, are accustomed to look upon the grouting of brick-work as the invention of the enemy who finds some mischief still for idle hands to do, knowing that at its best it is only a weaker substitute for the solid filling of good mortar that thorough brick-work ought to have. How good work common brick grouted in every third course was likely to make, and what reason there is in the complaint of a correspondent in our last number, one may guess who has watched, as we have, a Western bricklayer spreading out an uneven bed of mortar ten or twelve feet long, on a wall built up in slices after the American fashion, then laying down his trowel, taking the bricks in both hands and pressing them down into the mortar, end to end, two at a time, till he got to the end of the mortar he had laid, then scraping off the protruding mortar from the face of the wall, and beginning the same process again. We do not know, to be sure, how common or how typical this way of working may be; but we have seen it on what ought to have been good work. It is perhaps not surprising, that in speaking of the change in his contract, Mr. Sexton should say, as he does somewhat naïvely, "In view of recent mishaps at the Rockford and Peoria Court Houses, it would seem this was a wise change;" or that distinction should be claimed for brick-work with "every course filled solid," even by grouting.

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ANOTHER thing that comes out strongly in Mr. Sexton's letter is the vagueness of contractors' ordinary processes of measuring, by drawings at least, and the untrustworthiness of their estimates. "A majority of the building talent of the city, most of them experts in figuring out quantities," estimated from the plans; and the computations of the quantity of brick required varied, he says, from ten to eighteen millions. If Mr. Sexton's own estimate of cost, three hundred and twenty-eight thousand dollars, was fifty thousand dollars below the average, we may infer that the extreme variation among the bids for this work was not less than a hundred thousand dollars, or about thirty per cent of the contract price. Architects know that such a variation in estimates of cost is not an uncommon thing; and since this is the success of "experts in figuring out quantities," who make their living or their fortunes by their expertness, architects may perhaps take consolation for a general want of confidence in their own estimates, which are confessedly only approximate. There is no knowing, to be sure, what sort of plans the contractors had to figure from: we may suppose that they were ordinary floor-plans, elevations, and sections, and in so large a building very likely to the scale of eight feet to the inch. It is astonishing that builders should be willing to risk their fortunes on such uncertain information as their estimates betoken; the fact that they do so shows that their occupation involves an amount of hazard that cannot be any thing else than demoralizing. That a business community should be willing to assign its work under such conditions, is hardly less astonishing. How the difference between one contractor's estimate and another's is covered in the work, is always a matter of wonder. The difference in skill of management counts for a great deal, and herein lies the legitimate advantage of one contractor over another. The difference in workmanship is another factor of great importance, one which it is desirable to reduce to a minimum, but extremely difficult, if not impossible, to provide against. The difference in the estimates of material, of which we have just cited an excessive example, is a third element of uncertainty, which is unnecessary, and ought in the interest alike of the contractor, the client, and the work, to be eliminated. The contractor's estimate indicates of course the amount of material that he intends to put into the building he estimates for. But it is the architect's business to decide by his plans and details what the quantity actually used shall be; and since the contract is commonly awarded to the lowest bidder, the chances are that the quantity allowed for is generally below the mark. The difference must come out of the work or out of the contractor, neither of which is desirable. There are many reasons why it is not well that the architect should himself do, or be responsible for, the computing by which the actual amounts are deduced from his plans; but it is certain that it ought to be done by some person of accurate and uniform methods, who has full explanations from the architect, and who has no interest in either exaggerating or cutting down the amounts. This is the office of the English quantity-surveyor, and of the French *métreur*, of whom we are convinced that it would be a great advantage to establish the counterpart here. Our own method is, as a rough-and-ready method, very easy to apply, but very slovenly and uncertain, and tends to make competing for "jobs" not much better than gambling. The contractors are not fairly matched, and are put under the maximum temptation to do bad work. There are few things more demoralizing to a man's faithfulness than to urge him to fix the lowest possible price for a piece of work without knowing what he has to do. It is hard to see, in fact, that the contract system as we manage it is any thing better than a clumsy make-shift, and it is one, as we know, that often proves costly. Three hundred and twenty-eight thousand dollars is too much to pay for a pig in a poke.

THE reports presented at the opening meeting of the Architectural Association (of London) for this winter's session indicate that its last year's work has not been less successful than that of the Institute. The younger society has fairly outgrown the older, its members counting over eight hundred, while those of the Institute, as we said last week, were six hundred and thirty-five. The work to which the Association gives its chief energy is educational, work which the Institute has gradually abandoned to it altogether, while as becomes its seniority it retains the leadership in matters of professional practice and standing with the outside world. Our readers will remember the series of professional tours of the Association, set on foot by the late Mr. Sharpe, and conducted by him for two or three successive summers, which have been among the most interesting of the things accomplished by the Association. We are glad to read, by the way, that there is a likelihood that the records of these tours, and the drawings collected in them, will be published, a thing which it was feared had been made impossible by Mr. Sharpe's death. The Association maintains a library, publishes a serial sketch-book, and keeps up several classes for the instruction of architectural students, — a class of Design, a class of Elementary Design, a class for the study of Color Decoration, an Architectural Science class, a class of Construction and Practice, and a Surveying class. It has also established a branch at Birmingham.

THE President in his annual address touched especially on the subjects of articled pupils and of competitions. The custom which obtains in England of binding an architect's pupils to him for four or five years, he stigmatized as the bane of the profession; a revolutionary doctrine which he qualified by saying that the difficulty was in binding young men to permanent service before it was clear whether they were fit to become architects or not, and so filling up the profession with a great number of persons who would be better out of it. He would give every architectural student a year of probation, during which he might discover whether or no he was suited for an architect's work, requiring that he should first of all receive an "ordinary education," including "an acquaintance with modern languages and some knowledge of the dead languages," the usual modicum of Euclid, a course of lectures in natural philosophy, and above all a taste for drawing, and a knowledge of the use of mathematical drawing-instruments; after his year of probation he should, if he would continue, be articled in the usual way, but not to the architect with whom he had passed this year, that he might have the benefit of different influences. Apart from the obvious objection which was made at the meeting, that few architects would care to have pupils for a year on probation, with the understanding that if they proved good for any thing they were to be turned over to some one else, the suggestion would certainly seem a wise one, if the system of apprenticeship is to be maintained, — a system whose excellence we much doubt. There is no appearance, however, of any disposition among English architects to substitute a system of schooling for it. Mr. Price argued strongly against the young men's habit of addicting themselves to competitions. He distrusted competitions as misleading as well as wasteful of labor and unfair; and urged the young practitioner instead to begin practice by giving half his time to the service of some older architect, or by working in consultation with his seniors, — advice in which we fancy a great part of the profession are ready to go with him.

THE masons' war in London still continues. According to a late number of the *Builder*, although a hundred or more of the masters have yielded, and pay the ten pence per hour which the masons demand, the great body of them, or at least those who employ the greater part of the men, are still determined in their resistance. The importance of their resistance is indicated by the fact that of the twenty-five hundred stone-masons in the London society seventeen hundred are on strike. The cost of the strike to the Union is said to be about nine hundred pounds per week; and their taxes, aided by contributions from the provincial societies, to amount to a thousand pounds or more. Up to a short time ago, two hundred and thirty-nine men had been imported, of whom all but about ninety had delivered themselves over to the strikers. This has added greatly to their expenses; and if the masters find that they have wasted money on men who deserted as soon as they were got, there is an offset in the fact that the waste to the strikers is greater yet. If we may judge from a despatch sent to Washington by our consul-general at London, Mr. Badeau, the support of the masons is not likely to hold out very well; for he writes that American workmen are constantly coming to him out of work and

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in deplorable poverty, asking to be sent home at the expense of the government. This state of things may show such persons that their English brethren are not likely to support them any longer than they feel compelled to, and might have some salutary effect in teaching them to comply with their promises.

AT a late meeting of the masters, a resolution was passed empowering their committee to continue the importation of foreign workmen; and the secretary replied that he had offers from the Continent of a thousand good masons, who were ready to come as soon as arrangements were made for them. A proposition for a conference from the men was referred to the committee, with a unanimous expression of opinion that it should be rejected. The Masters' Association had issued a notice to the defaulting Americans and Canadians, that unless they reported themselves for work to Mr. Booth and the Messrs. Dove, who had imported them, they would be sued for breach of contract.

THE CONVENTION OF THE INSTITUTE.

REPORT OF THE ELEVENTH ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS, HELD AT BOSTON, OCT. 17, 18, AND 19, 1877.

THE Convention met in the hall of the Society of Arts at the Massachusetts Institute of Technology, on Wednesday, Oct. 17, at ten, A.M., the President, MR. THOMAS U. WALTER, being in the chair; and was opened as usual with the annual address by the President, which has already been published (*American Architect*, No. 96).

The reading of the report of the Board of Trustees by the Secretary, MR. BLOOR, followed. The report was accepted, the consideration of its recommendations being deferred.

The report of the Treasurer, MR. HATFIELD, was read; and Messrs. Sturgis, Longfellow, and Stone were appointed an auditing committee, to whom it was referred.

The Secretary read the reports of the Committee on Publications and the Secretary for Foreign Correspondence, which were accepted. No reports were received from the Committee on Education, or from the Committee on Professional Practice. Reports were read and accepted from the Chapters at New York, Philadelphia, Boston, Baltimore, and the Rhode Island Chapter.

The election of officers being next in order, it was voted, on motion of MR. VAN BRUNT, that a nominating committee of one member from each Chapter should be appointed by the President; and the election was deferred till the committee should report.

The report of the Special Committee on Finance was at their request postponed till a later session.

In recognition of the hospitality of the Massachusetts Institute of Technology, at the suggestion of PROFESSOR WARE, the architectural students of the Institute were invited to attend the sessions of the Convention. An invitation was received from the Trustees of the Boston Museum of Fine Arts, to attend a reception at the Museum on Friday evening.

On motion of MR. WARE the report of the Board of Trustees was then taken up. The first point considered was the collection of information in regard to adjudicated cases upon the emoluments of architects, a subject which had been under consideration by the Trustees, and by them referred to a special committee.

MR. HAIGHT, in behalf of the committee, said that but few answers had been received to the requests sent out by the Board of Trustees for information concerning cases which had been tried in the United States. Two important cases involving considerable amounts were pending in the New York courts, and until these were decided it was undesirable to make a formal report. The committee, therefore, simply reported progress, with a request that any members who knew of cases that had been tried and settled should give information of them to the committee.

The recommendation of the Trustees, that a report should be procured from each Chapter on the building materials found and used in its neighborhood, was deferred till the consideration of the report of the Rhode Island Chapter on a similar subject.

The recommendation concerning the establishment of a degree to be conferred upon architectural students was referred to the Committee on Education, with instructions to report at the next Convention.

On motion of MR. WARE, the recommendation concerning the Washington Monument was passed over.

The question was considered which had been raised by the Trustees as to the proper status in the Institute of members who, it was said, while appearing on the rolls merely as honorary members, were really more or less engaged in professional work for which they received fees. Explanation being asked, the cases of these members were specified; and the inquiry of the Trustees being read, concerning "the propriety of striking from the roll of honorary members the name of any resident of this country who derives any emolument, direct or otherwise, from the practice of architecture," it was explained by the Secretary that the Trustees desired general instructions as to what should be done in such cases: whether such members should be dropped, or should be notified that their proper place was among the corresponding members.

MR. RICHARDSON deprecated any action that might seem ungracious in matters which were merely technical irregularities, and suggested that such members should be requested to become professional members, if qualified, with the alternative of resigning if they preferred.

MR. HARTSHORN offered a resolution, which, after some verbal amendments suggested and accepted, read as follows: —

"That when any person residing in this country, elected an honorary member of the Institute, shall derive any emolument, direct or indirect, from the practice of architecture, the Trustees shall request such person to become a professional or corresponding member, if qualified, or, if he prefers, to resign his membership."

After some further discussion, the hour for adjournment having passed, the subject was postponed, and the convention adjourned till the evening session.

EVENING SESSION.

The Convention was called to order at eight o'clock by the President; MR. VAN BRUNT, in the absence of the Secretary, being appointed Secretary *pro tem.*

MR. WARE, in opening the session, in behalf of the Committee of Arrangements, remarked that the committee had taken example by the convention of the Society of Civil Engineers in arranging that a series of rather short papers should be read on the subject appointed for discussion, Fire-proof Building; believing that in this way it would be found what points were settled by general agreement, while those which were mooted would furnish topics for the discussions which were to follow the papers. Four papers had been received in answer to the invitation by the committee.

MR. WARE then read a paper by Mr. Franz Schumann, C.E., on the use of iron in fire-proof construction. The paper gave a discussion of the effects of heat on iron and its conductivity, with an analysis of the rapidity of its conduction when exposed and when protected by a non-conducting material. It ended by urging iron as the essential constructive material for fire-proof buildings, and the importance of protecting it by a covering of brick or other earthen substance.

A paper by MR. LIENAU of the New York Chapter was then read by MR. WARE, chiefly on the use of brick, which he advocated, and on certain forms of vaulted floors in use in Europe. MR. WIGHT of the Chicago Chapter followed with a paper on the protection of iron from fire by coverings of terra-cotta and other non-conductors. The closing paper was by MR. R. G. HATFIELD of the New York Chapter, giving a summary of the losses from fires in the United States during the last thirty years, and estimates of the annual loss to the country from them; and calling attention to the value of solid wooden floors as a means of checking the spread of fire in buildings. All the papers united in agreeing that none of the methods of building in use in the United States were really adequate to resist fire; and that where iron was used it needed protection from some more fire-resisting material. The papers were referred to the Committee on Publications.

In the discussion that followed the papers, MR. LORING of the Chicago Chapter described a kind of terra-cotta that he had succeeded in manufacturing, which was very porous, and just half as heavy as the ordinary material. He tempered the clay with an equal bulk of sawdust, which by careful and prolonged firing was entirely burned away, leaving the terra-cotta very light and non-conducting, and so porous that nails or screws could be driven into it with ease.

MR. PEABODY gave an account of the usual construction of floors in houses at Paris. Iron beams being put in in the usual way, he said, strips of iron were laid between them two or three feet apart so as to form a skeleton for the plaster filling. A temporary floor of boards was laid against the under side of the beams, shored up from below; and on these were laid little vessels like flower-pots, very close together, between the beams and strips. Upon these was poured a fluid mixture of fresh plaster with fragments of stone, broken plastering, and other building rubbish from the demolition of the old buildings, so far as he could judge. As soon as the mixture had set, the shores and flooring below were taken away, and the ceiling beneath plastered; strips of wood were laid on the iron beams, and on these the floor was laid, having no bearing on the filling of pots and plaster, which had only its own weight to carry. In some parts of France, he believed the local plaster was not strong enough to allow of this construction. He had seen cases in London where the same sort of thing was done, but with spans of four or five feet filled in with concrete, still without resting any weight on the concrete, which served only to incase the beams. He had been asked why the Brewer Building had been included in that afternoon's excursion. The only point of interest was the construction of the mill-flooring in it, where instead of small joists set in the usual way there were large joists, like girders, set some feet apart, and on them a floor of stout plank. The building was intended to store a large quantity of inflammable goods. With such contents brick and iron floors could not be considered safe against fire; and he thought that to build

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floors that would not readily burn, while if they did take fire the exposed timbers could be easily reached with water, was a good rough-and-ready way of opposing fire.

MR. HATFIELD remarked that this mill-flooring system was essentially the system of solid floors which he had suggested in his paper, in which the beams, being laid close together, need be only of little depth, — say three inches.

MR. PEABODY suggested the danger of injury from the swelling of solid floors. MR. RICHARDSON thought the danger of dry-rot was an objection to all solid floors, as well as to beams incased in plaster.

MR. HATFIELD had never himself built solid floors; the danger of decay seemed to him the most serious one, and was to be met by some antiseptic process. The kyanizing and Burnetizing processes were of value, till something more effective should be discovered.

MR. LONGFELLOW, in answer to a question, described a kind of vaulted floor that was in use in Tuscany. He had inquired into it when in Italy, and was told that the floors were vaulted over spans of sixteen or eighteen feet, with one thickness of bricks laid flat, forming a shell of about two inches thick, and with a very small rise, — a foot or so. This kind of vaulting was local, and done by workmen who were bred to the traditions of the trade in their own provinces: when it had been attempted in other provinces by new workmen, it had not succeeded; the vaults had fallen and done mischief, and the attempt had been abandoned. He spoke from recollection. The record he had made of the process had been sent to Boston after the great fire, and he had not seen it since. It was his impression that the vaults were laid without centres.

MR. WARE remembered that in the account sent home by Mr. Longfellow, it was mentioned that the vaulting system had not been found practicable in Venice because of the thinness of the walls, which, being built on piles, were not massive enough to bear the thrust of the vaults that the solid stone walls of Tuscany were able to resist.

MR. HATFIELD described the vaulting of a room which he had seen building in Italy. It was a room about sixteen feet square, and the vault was a barrel vault of perhaps three feet rise. The thickness of the bricks, which were laid flat, and of the arch therefore, was only an inch and a quarter. The workman began by running a "screed" against the wall at the springing of the vault, then a forming-rib against the side wall. He next laid the first course of his vault at the springing, and the next against that, and so on, without any centring, till he had extended it some distance. Then he strengthened the middle and the end by two ribs of brick-work, attached to the wall, and projecting like cantilevers. He did not stay to see the work finished, but presumed the workmen went on in this way till the crowning course was laid. Above the vault they placed wooden beams, on which they laid the floor. He also remembered standing on an arched floor in the unfinished synagogue at Turin. The floor was on groined arches springing from piers, and with a span of about thirty-five feet. Openings were left at the groins, through which he looked, and saw to his great surprise that the shell of the vault was not more than four or four and a half inches thick.

MR. HARTWELL mentioned a method of vaulting a floor, of which he had somewhere seen a description,[1] in which the vault was begun at the corners, instead of the sides, throwing diagonal arches across from side to side, and repeating them till they meet at the centre in a square opening diagonal to the room, which was then filled up, making a vault which has a thrust in every direction instead of only in two. Another method for wooden floors, recorded, he thought, in Gwilt's Encyclopædia, was by laying a solid floor of several thicknesses of boards in strips crossing each other diagonally in various directions, with a slight rise in the middle.

MR. STONE quoted instances of underground cisterns which were built in his neighborhood, of twelve or fourteen feet across, which were domed in with brick-work four inches thick, laid without centres. In one case such a cistern had been put in a field, and afterwards, a drive-way being carried over it, carriages and horses were driven across it without injury. In regard to wood-construction, the companies which insured mills in Rhode Island insisted that there should be no boxed-up work. All the floors were of the kind described by Mr. Peabody. The floors were usually of three-inch plank splined together, and the girders sometimes nine or even ten feet apart; for the wider spacing they generally used four-inch spruce plank, put together with splines, and then covered with hard-pine flooring. Practically no cornices were allowed: if there were any outside they must be boarded close upon the ends of the projecting rafters, with no continuous spaces. For the protection of the "picker" rooms iron doors were scarcely used, but always doors made of a light iron frame, with thin boarding on both sides, and covered with tin. It often happened that considerable fires occurred in the picker rooms, without extending beyond them. There were one or two things suggested in the papers that had been read which seemed to him questionable; for instance, building a vaulted wall with only a four-inch lining, which lining he considered a very slight wall to carry, as it had to, the weight of the floors. The methods suggested of incasing iron beams with plaster seemed to him insecure. He could not conceive of the plaster getting sufficient hold of the beam to make it secure against vibration, if it were thick enough to have any weight, or of its doing any good if it were not.

MR. PRESTON, in answer to MR. STONE, said that the only question of a four-inch lining wall being too slight was in case of insufficient tying to the main wall. He instanced the building in which the session was then held (the Massachusetts Institute of Technology), where the lining-wall was a four-inch wall and carried the floors, but was bonded by ties sixteen inches apart to the main walls, which varied, at different heights, from three feet to twenty inches in thickness.

The discussion having ended, the President announced Messrs. McArthur of Philadelphia, Stone of Providence, Wight of Chicago, Scofield of Cleveland, Lind of Baltimore, and Peabody of Boston, as the nominating committee.

After some discussion, it was voted to accept the invitation of the Trustees of the Art Museum, and to visit the Museum at six o'clock on Friday evening, and that the annual dinner should be at eight o'clock the same evening.

The Convention then adjourned till Thursday morning.

[1] See the account of Mr. Niernsée's report on the Vienna Exhibition, *American Architect*, Sept. 16, 1876.

THE ILLUSTRATIONS.

DORMITORY FOR BROWN UNIVERSITY, PROVIDENCE, R.I. MESSRS. STONE AND CARPENTER, ARCHITECTS.

This building is to stand at the south end of the rear campus, facing George Street, and about seventy feet from the line of the street. It is to be built of dark face bricks laid in black mortar, with underpinning, steps, window caps and sills, of brown stone; and bands, coping, etc., of terra-cotta. The roofs will be covered with slates or tiles. The building is to face the south, hence the peculiar arrangement of the rooms, all of the studies in the central portion of the building being placed upon the south side, and their bedrooms opening directly from them on the north side. The rooms are arranged in suites of two, — a study and one bedroom, — and suites of three, — a study and two bedrooms; giving accommodation for forty-eight students. The foundations are laid, and the cellar walls are built up to grade, ready to receive the superstructure, which will be built next summer.

DESIGN FOR THE NEW DORMITORY BUILDING AT BROWN UNIVERSITY, PROVIDENCE, R.I. MESSRS. WALKER AND GOULD, ARCHITECTS.

THIS is one of the designs submitted in competition for the new dormitory building for Brown University at Providence, R.I. It was intended to be built of pressed brick, with light sandstone for the belts, copings, window sills and caps, and brown stone laid in squares between second and third story windows. The underpinning was to be laid in courses of split granite; the roof to be slated, and the ridges to have terra-cotta ridge-crests.

HOUSE AT LOWELL, MASS. MESSRS. WARE AND VAN BRUNT, ARCHITECTS.

The figures upon the plans refer to the rooms as follows: on the first floor plan, 1, Hall; 2, Parlor; 3, Dining-room; 4, Kitchen; 5, Stores; 6, Garden-entrance; 7, Rear-entrance; 8, China-closet; 9, Closets; 10, Vestibules. On the second floor plan, 1, Corridor; 2, Chambers; 3, Bath-room; 4, Closets; 5, Clothes-closet.

PRIVATE HOUSE IN BERLIN. MESSRS. EBE AND BENDA, ARCHITECTS.

This building, of which the plans of two floors are here given, has lately been erected for Lieut-Col. von Thiele-Winkler in the park-like suburbs of Berlin, the Regenten Strasse Berlin. Above the second story is a mansard, the kitchens and other rooms for housekeeping being in the basement. The façades are built of Oberkirchner sandstone, a most excellent material which with time assumes a delicate yellow-green tone, and which is now used for the completion of the Cologne Cathedral in place of the Caen stone formerly employed. The front is somewhat in the manner of the Heidelberg Renaissance. The principal motive is a frieze of figures from the Edda, with which all the ornament is in harmony. The sidewalk, posts, and the socle and steps of the house are of red Swedish granite; many of the walls are inlaid with marbles. In Berlin, a city of stucco and terra-cotta, there are but few private dwellings of such monumental materials. Nearly all the rooms of the ground-floor are vaulted, their decorations being of bronze tarsia work, and carvings of rare woods, no imitations having been tolerated by the builder. The plate is copied from the *Allegemeine Bauzeitung*. The following explanation of the distribution of the rooms refers to the plans which will be found on one of the illustrated pages: —

Ground Floor. — A, Carriage-way; B, Vestibule; C, Hall; D, Dumb-waiter; E, Master's Reception-room; F, Dining-room; G, Saloon; H, Ball and Music-room; I, Master's Study; J, Garden; K, Alcove; L, Secretaries' room; M, Servant's room; NN, Wardrobes; O, Bath; PP, Side Staircases; Q, Bower; R, Grand Stair-

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case; S, Court; T, Stall; V, Water-closet; W, Stable Staircase; X, Set-bowl; YY, Carriage-rooms; Z, Elevator. *Second Story.* — A, Library; B, Sitting-room; C, Sitting-room; D, Dumb-waiter; E, Chamber of mistress; F, Toilette; G, Water-closet; HH, Alcoves; I, Sitting-room; J, Grand Staircase; K, Ladies' Room; LL, Chambers; M, Coachman's Room; N, Wardrobe; O, Bath; PP, Coachman's Chamber; Q, Balcony; RR, Corridors; S, Hall; T, Ante-chamber; U, Loggia; W, Hay-loft; X, Terrace; Y, Staircase to mansard; Z, Elevator.

MODERN CHURCH ARCHITECTURE.

THE committee who had in charge the preparation of the programme of the late convention of the American Institute of Architects invited the members of the Institute to prepare short papers on the subjects named in the programme. The object of this was to allow time for the discussion which it was thought the papers would be sure to evoke. On the subject, "Religious Architecture," the following short papers were read by Mr. R. S. Peabody and Mr. C. A. Cummings, both of the Boston Chapter. Unfortunately the pressure of executive business prevented any discussion of these papers, and the debate was lost.

Mr. Peabody said: —

There is one practice in the building of churches common to France and England, but which is almost unknown here. It is the practice of making them permanent, durable, secure.

A recent walk about London showed me not rare instances, but great numbers of ritualistic churches built for mission purposes, and in a way hardly to be seen here. I have the photographs of many here to-night. The interior walls are brick, the paving masonry of some sort, and the roof vaulted so far as the money holds out. The churches I think of principally are those of Brook; severe and monastic in design, and evidently of little cost; but they are durable. I recall a church of Pierson's where this intention was not abandoned for want of funds, for the choir and transept had been built in a rich and costly manner with the early English detail of which he is such a master; and the nave was a long galvanized-iron temporary church.

It is just the same in France. A series of new Romanesque churches have been built in the Menilmontant district. Wood is hardly apparent in these constructions. The walls are stone; the vaulting is sometimes made by turning brick arches without centres from iron vaulting ribs; and the vault is subsequently plastered; the floors are mosaic perhaps, and sometimes covered with a wooden floor beneath the seats.

By these references I wish to note the almost universal custom in other countries; and these churches, many of them, are no more costly than some we have visited to-day.

Every public building, and in just the same way every church of importance, is practically not alone for our day, but an endowment for future generations. It should thus be looked upon, and the universal practice of building churches of a destructible character, while it is unknown in other countries, is unworthy of ours. Take our noblest example, this splendid Trinity; there is nothing to prevent its being destroyed in a night by fire. In England or France it might have no cellar, but it would have masonry floors, probably masonry ceilings, and an interior of masonry; while this has wooden floors, and roof and walls plastered on wooden furrings, and as I am told its fittings are too choice to permit its general use by the Convention. I cite it as our noblest example; and our others are like it, wooden churches surrounded by a masonry wall, and fitted with equally nice furniture. It is useless to talk of cold and echoes. These offer the problems somebody must solve. I submit that a monumental church should be built as an endowed possession for other generations, and rough enough for every use; and that as such, ours are unworthy.

Now, there is one more suggestion which these churches offer. We readily acknowledge the perfection of Mr. Pierson's Gothic churches and others in England. On the other hand, we see in St. Clothilde in Paris a very lifeless Gothic church, and in St. Ambroise and the other Parisian Romanesque churches equally lifeless examples of round-arched work; while the most perfect of Mr. Pierson's Gothic churches, though it may equal, cannot surpass the nobility, serenity, church-like air of Hittorf's classical basilica of St. Vincent de Paul, or Vaudremer's Byzantine parish church at Montrouge; while the Romanesque that makes so poor a figure in Paris, certainly has not diminished the ecclesiastical effect of our own Trinity. From this I argue, that as I believe it to be in domestic work, so I think in church work, the style employed has little to do with the character of the church; but the feeling and ability of the designer every thing. I mistrust the Gothic dogmas in church work as much as I do in other work. In fact, with all our accumulated knowledge, I think that the style matters less and less, and the artist more and more, — and this in church as in domestic designing.

In our designing of Congregational churches, we are met by two opposing influences: on the one hand, utilitarianism, — the needs of the parish in the modern order of things; on the other, ritualism, — that returning to the old symbols, customs, and decorations which the Puritans threw aside in sheer opposition, but of which, now that the exigency is past, all sects see the value and pleasure. I shall leave to others to say where this line shall be drawn, and to speak as to the complicated arrangements now required in connection with a modern Congregational church. I confess that I think the architects are too prone to the old ways, and that often, when a Congregational church is wanted, the parish get too mediæval plans, and churches fitted alone for obsolete forms of worship. This, of course, is a wrong tendency, and our chief fault in church building. Obviously, the purposes to which the building is to be put — the present forms of religious worship — must be our guide.

While expounding is the main object, the seats must be arranged accordingly. So long as people practise total immersion as a religious rite, the undesirable but useful force-pump, hot-water boiler, and marble or lead tank must be a feature in the church. But, with all the changes that have come about lately, — church parlors, lecture-room seatings, cooking-stoves, pantries, and the other adjuncts of a well-regulated meeting-house, — it seems to me that the fact that the auditorium is, to most sects, still a house of worship, is likely to be lost sight of rather than that, in this practical country, these wants should rest unsatisfied, in spite of the architect's backwardness. I distinctly would add every useful feature to the building; but I would strive to keep the church itself, from bottom to top, sacred, and put the adjuncts elsewhere.

It is with pleasure that lately I have heard two Congregational ministers express regret at the custom of placing the minister in the centre of the church, and setting his preaching on the same level with the prayers and Bible-readings, the marriages, christenings, burials, and communions, which might well be distinguished from the first. These were Congregational ministers, and not, as might be supposed, Episcopalians; and whatever may be thought of this particular scheme, it seemed to me to be in the right spirit. On the other hand, a church committee recently pointed to a communion-table, behind a chancel-rail, of the most determined Yankee rococo character, and, styling it the altar, explained to us that as the lay members spoke from behind the chancel-rail, and not from the platform, the altar was much in the way, and the proper arrangement was to have it shoved beneath the pulpit, and leave free play for the lay speaker.

It is not for us architects to teach the people religion, but there are æsthetic views which this spirit offends; and on such grounds alone, while admitting force-pumps, tanks, cooking-stoves, and pantries to their proper places, I think we should keep in mind, and increase as much as possible, the idea that the main church is not a church-parlor so much as a place of worship.

Mr. Cummings said: —

While the Church, as a governing and dominating force, was really held in reverence, its edifices were monuments of its power, and acquired a dignity and grandeur wholly unconnected with their practical use. To-day, in Protestant lands, the Church is a shadow, and churches are no longer monuments, but buildings erected for the practical uses of public worship, which grows every year more and more simple, and in which the first necessity is that the words spoken by the preacher shall be clearly heard by all his congregation.

Notwithstanding this change in the conditions, we go on building imitations of the old cathedrals, the monuments of an age when the church service was a spectacle addressed by a ruling priesthood to the senses of a crowd of ignorant subjects.

We must of course discriminate between the religious purposes of Catholic and Protestant forms of worship. A Catholic church has to-day the same requirements which a Catholic church had in the Middle Ages; and the problem presented to the architect of a Catholic church to-day is to produce a building which, in general plan, size, and splendor, will most resemble its predecessors of six hundred years ago. He feels no embarrassment as to characteristics, but simply and frankly turns to his books, and does his best to preserve the traditions of the great days of the Church.

But the architect who is to build a church for a Protestant congregation has a different task before him. In his church there are no processions, no spectacles; and though the forms are more elaborate and the conditions therefore somewhat different in the churches of the Episcopal denomination than in those of the Congregational bodies, still there is so much similarity that the points of difference may for this occasion be overlooked.

The meeting-houses of two or three generations ago, of which in this city, Hollis-street and the West Church are remaining examples, although quite innocent of architectural design, at least so far as their interior is concerned, were perfectly adapted to their uses. Small, square, low, with a single broad gallery nearly at the level of the pulpit, with an abundance of light, and with all spaces unobstructed, they met the conditions of a simple Congregational service. It ought to be possible to preserve these virtues, while adding the touch of grace which was all they lacked. But the demon of ambition, entering alike into the souls of architects and committees, has encumbered their successors with great columns which cut off the pulpit from one-third of the congregation, has raised high into the air a high-pitched gloomy roof which absorbs the voice of the preacher as well as the light from the windows, has filled these windows with dark and sombre glass, and made the church so dark that the faithful who enter stumble over their own footstools, and can scarcely find the places in their

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service-books; has enlarged the size until all feeling of association in worship has disappeared. All this we have done in blind and unintelligent following of the mediæval traditions; and the result is that not only have the churches been unpleasant and unwholesome places for worship, but they have been unsatisfactory even as architectural monuments.

If then I am asked what should be the characteristics of church architecture to-day, I should begin by a negative, — they should *not* be the characteristics of cathedral architecture six hundred years ago. Not for us are the cliff-like walls, the mighty towers, the vast and sombre spaces, the dim echoing roofs, of the great churches of old. Our churches must be *houses* of worship, warm, light, cheerful, and fitted for a service in which not only the priest but the people are to join as equals.

The convenience of such a service would seem to discourage a cruciform plan, except as a modification of the square, for greater ease of construction, and greater grace of design. (The Greek cross recommends itself in this sense.)

The rigor of our climate, and the importance of the warming problem, would in large churches diminish the area of glass in the windows. In cities the privacy of the congregation will be less invaded by the noises of the street if the windows are high in the walls, or if the chief light comes from the roof.

In a church where the chief portion of the service consists in the reading and speaking of the preacher, the limit of reasonable size and height is soon reached: hence the ambition which leads beyond this limit is a snare.

These, and such as these, seem to me the essentials in modern Protestant church building. These once admitted, there remains the question as to style and decoration. But it seems to me that here we should be as broad as the diversity of tastes will prompt. That one Church should be Gothic, and another Romanesque, and a third Renaissance; that in one vigor should predominate, in another grace; that in one the construction of walls and roof should proclaim themselves in the interior, while in another a screen of plaster should make the interior design and decoration independent of the construction, — all this is but to say that there will be diversity of gifts, but the same spirit. We should not wish all our churches to be cast in one mould. The architect who sets himself heartily to his work, and who is happy in it, will know how, according to the means at his command, to express the seriousness, the reverence, the repose, which should characterize the places which intelligent and Christian men set apart for the worship of God.

CORRESPONDENCE.

THE LONG ISLAND HISTORICAL SOCIETY'S BUILDING. — SOME NEW WORK.

THE work upon the Long Island Historical Society's building already gives promise of a muddle; and it will not be surprising if considerable grumbling is heard when the award is made by the building-committee. The idea of building a special building for their accommodation has long been entertained by members of the society; and some years ago a plan was secured from Mr. Leopold Eidlitz, architect, paid for by the then building-committee, and laid away to disuse. With recent acquisition of funds the desire to build has revived; and with the first faint hints of this purpose came a score, more or less, of architects anxious to make designs. The secretary and librarian was waited upon; and upon his notion of what the society needed, and what the yet unselected building-committee might decide was necessary, several architects have already prepared plans and elevations, and sent them to the rooms of the society. These professional gentlemen may possibly have labored under a misapprehension of the facts; but it certainly would have been more dignified, and more what might have been expected from several of the misguided ones, to have waited until the call for designs had been formally and officially issued. As it is not expected that more than $100,000 will be spent on the building, — which is to have a lecture-hall, a library, and museum, with the necessary ante-rooms, consultation and committee chambers, all on a 75 x 90 foot plat, — it is not very likely that unsuccessful architects in the competition will receive any remuneration, however slight, for their work. It may be, too, that the committee will select an architect without competition; and if so, the gentlemen who have so energetically elaborated designs may get only their labor for their pains. A day or two ago the president of the society named the committee as follows, but no action has yet been taken by them: Samuel McLean, S. B. Chittenden, A. A. Low, H. E. Pierrepont, James R. Taylor, Henry C. Murphy, and Henry Sheldon, with Rev. R. S. Storrs, president, and A. W. Humphreys, treasurer, as *ex-officio* members. These are names of New York's most honored merchants and men of business, but not necessarily expert discriminators between designs in Queen Anne, Victorian Gothic, Renaissance, with possibly a sprinkling of corrugated iron "pepper-box" architecture. However, we shall see what we shall see.

Among the architects the young firm of McKim, Mead, and Bigelow are positively busy. At Lenox, Mass., they have a country-house for Mr. Samuel G. Ward of the banking house of Brown Brothers. It is on a hillside, with the requirements that all the living-rooms and family apartments shall have a southern exposure, and that the building shall be low. The result is a long rambling house nearly 200 feet in length, — merely a string of rooms with a passage-way on the north side. The family rooms at one end, and the servants' quarters at the other, remind one of old Southern mansions. The sides will be shingled down to the water-table; and with cathedral-glass windows and odd gablets, the house has such a quaint look, that but for a few Queen Anne fantasies it might pass for an old Puritan's homestead. In the city McKim, Mead, and Bigelow have designed an out-and-out Queen Anne front for a private residence on Thirty-fourth Street, now building for Mr. Dickinson. The materials are brick and blue stone, with iron beams and other fire-proof devices, while the passenger-lift, the conservatories heated by indirect radiation, and other accessories will raise the cost of the 25 x 100 feet four-story house to $30,000. A Gothic rectory for Christ Church, Rye, N.Y., is also among the works now in progress under these architects.

From the amount of study going on in various offices, and from little hints and sketches here and there, the prospects are for a deluge of Queen Anne fronts; and from inexperienced hands, some rarely fantastic combinations may be looked for.

William Fields and Son are busy upon a new block, 200 feet long, of the South Brooklyn model tenements for Mr. White. Two parts of these have already been erected, and have given such satisfaction that additional land was bought, and new work begun. These designs are worthy of special notice, as fulfilling the requirements of economy, privacy, excellent sanitary appliances, strength, fire-proof qualities, and cheapness, at one and the same time. They have also in hand a large double residence in brick for Mr. George Ehrst, to cost about $50,000. The house will stand on Fourth Avenue near Ninety-second Street, and will be about 45 x 72 feet.

The "Florence" apartment-house at Eighteenth Street and Fourth Avenue, by Emile Grewé, promises to be superior to the usual run of such buildings. A frontage of 200 feet on the street, and a flank of 53 feet on the avenue, with six stories in height, gives opportunity for some good grouping of parts. There is an L running back 92 feet also. Brick and Nova Scotia stone with polished granite columns will be used. The plan is marred by the long narrow passages so frequent and so objectionable in flat-houses, but ample light is given to all rooms. A restaurant with five suites of rooms on the first floor, with six sets of apartments on the upper floors, make up the arrangement of interior parts. The cost of the building will be over $200,000. W.

THE TEMPLE OF THE SUN.

THE late Professor Orton, in a letter written for the New York *Tribune* only a short time before his death, gave this description of a renowned Peruvian temple at Cuzco: —

"Just north of the city, and rising five hundred feet above the Plaza, is the famous hill of Sacsai-huaman. On the slope is the church of San Cristobal, which unfortunately covers what tradition calls the remains of the palace of Manco Capac. This Manco Capac must have been a wonderful man to have come from the bleak island of Titicaca, and suddenly developed a talent for architecture which would shine to-day. The masonry of the Temple of the Sun cannot be surpassed; and, judging from the few courses of cut stone visible near San Cristobal, his palace would rival any structure on Fifth Avenue. Crowning Sacsai-huaman is the celebrated fortress, — the Ehrenbreitstein of Peru, where so much brave fighting was done three centuries ago; the Indian for his country, the Spaniard for his gold. Three ugly crosses deface it. Away with them! why crucify the hill afresh — which they certainly do if they represent the religion in the city below? Sacsai-huaman (which has the singular meaning of 'Vulture, gorge thyself') is not higher than surrounding summits, but it has steep declivities, save on the north side, where it blends with the highlands beyond. It is this exposed side on the north that is so remarkably defended. Here are three successive semicircular walls of rough polyangular stones without mortar, yet accurately fitting. These stones, or rather rocks, are among the largest ever handled by man. There is one twenty feet high, nine feet wide, and seven thick, and must weigh nearly one hundred tons. Another has a face about fifteen feet square, and has eleven angles, to which its neighbors closely correspond. The stones come from a limestone quarry near by. But how they were transplanted, even a short distance, and lifted into place, it is not easy to see. The style of masonry is like that in the Calle del Triunfo; all the stones are of irregular shape, yet make perfect joints with each other. Evidently this Cyclopean style did not save labor, but rather increased it; for to cut ten faces on a stone with no two angles alike, yet matching those around it, is more difficult than to make all rectangular. But strength was designed and secured by this novel method; for the stones are so tied in that no one can be taken singly, and every joint is broken. The lowest line of fortification is the most colossal, and has numerous projecting angles; but the height nowhere exceeds twenty feet. And the mystery is, why such a massive defence against bows and arrows (it was built, historians say, before Columbus was born), and so low that it could be easily scaled? It is one of the many riddles of ancient Peru. Within a stone's throw of Sacsai-huaman is the

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Rodadero, or abiding-place, a convex hill of limestone, curiously grooved. Here, cut out of the solid rock, are thirteen seats, or steps, in four rows, facing 14° S. of E.; and close by is another series, which faces 20° S. of W. In the neighboring rocks are hosts of squarely-cut places, hardly seats, for they are too narrow, — rather altars for household gods. But there is such an utter want of system and of uniformity, and withal so many, one is disposed to think they are the random work of an idling race who had nothing else to do. Still farther north of the Rodadero are traces of the royal road, walled in and paved with small limestone blocks, which was projected to reach Quito.

"All these monuments in Cuzco are supposed to be later than those at Tiahuanuco, Pachacamac, and Trujillo. Without doubt they are antedated by the monoliths south of Titicaca; but about their being erected by the race that met the Spaniards, I am sceptical. The relics preserved in the two largest collections of antiquities in Cuzco, the 'Centeno' and 'Montez,' are comparatively recent. I can readily believe they were made by a people as weak as Pizarro found; they exhibit a state of society in the last stages of decay. There is nothing noble or intelligent in their handiwork. It is inconceivable that the same people reared the walls of the Temple of the Sun, and made these rude, paltry, obscene images, — many of them obscene enough to make Sodom and Pompeii blush. The materials are gold, silver, copper, champi (copper and gold alloyed), stone and wood; and I have seen a breastplate of bell-metal. The objects usually represented are men and women, the llama, deer, monkey, guinea-pig, peccary, huma, cats, birds, snakes, turtles, fish, crab, maize, chirimoya, and melon. A hunchback with enormous mouth is called Manco Capac; he carries a hatchet, and his wife an ear of corn and a distaff. Another represents them worshipping the sun; and in another they are sitting under a palm-tree. All of these images show only the capacity of a child; nothing is true to nature; even their favorite llama is caricatured. In the entire Centeno Collection of a thousand antiquities, only one specimen, a large *cantaro* or jar, would arrest the attention of the artist. Some of the images resemble the horrid idols that used to be worshipped in the Sandwich Islands.

"In reviewing the ancient works existing in Cuzco, one is struck with the paucity and simplicity of the instruments remaining, and, on the other hand, with the wonderful achievements in masonry. All the edifices are without cement, and also unrelieved by cornice, column, carving, or arch. The architects seem to have been able to follow straight lines only; where curved lines were necessary, as in representing animals, they failed. But while the few existing hieroglyphics are inscrutable, and the quipus is a riddle, these plain, solid works, ruined though they are, express the genius, the industry, the social institutions, and the religion of an unknown people. They could cut stone more easily than timber, but they could not make letters. It is oftener asked than answered, 'How was it possible for this primitive race to transport the huge blocks in Sacsai-huaman?' Von Tschudi finds an answer in the social institutions of the old Americans — all the people assembled. But it is not possible for a block weighing a hundred tons to be carried by the maximum number of men who can get hold of it. They evidently had machinery which has not come down to us. Another question still harder is, How could they cut granite, porphyry, and alaymosca, without iron? That they were not acquainted with iron is proved, first, by the fact that no iron-mine shows signs of having been worked; second, no iron implements have been discovered; and third, there is no word in Quichua for iron, any more than for horse and cow. No copper alloy I have seen was sufficient. And if champi had been used, as many think, some particles of gold would have been left on the face of the stones. I have no theory but that of attrition, — the 'diamond-cut-diamond' principle."

SELF-MADE ARCHITECTS.

——, WIS.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

It is not surprising that so much confusion exists in the public mind as to what is requisite to constitute an architect, after reading W's. communication in the number of Nov. 17.

"We are not sorry," says the editor, "to receive the letter from W. which we print in another column." If not "sorry," there must at least have been a shade of disappointment in reading that which sounds like an attempt to argue against the necessity of special training for the student of architecture, the principal point enforced in the articles which W. had read with deep interest.

W. writes in one of the concluding paragraphs, "The indications are, that we have too much scientific and too little practical knowledge of architecture." How one can be attained without the other, is a point requiring elucidation. If one possesses the scientific knowledge, he knows; and if he knows, he has the practical knowledge, has he not?

"The sciences are taught; the practical is only acquired by experience," again writes W. These terms, scientific and practical, are much confused in many minds. Nothing is now classed as a science, that rests simply upon theory. Verification by experiments, knowledge of the fact, is exacted. The word "science" means, knowledge.

It seems clearly evident that one of the most important functions of the *American Architect* is that of teaching the public how to distinguish pretender from possessor in architectural knowledge, whatever it be called, scientific or practical; and of rigorously insisting that he who pretends to be qualified by advertising himself as an architect, by putting out his sign, or otherwise, shall give some guaranty to the public that he is so qualified. Scarcely one man in a thousand, outside of the profession and such trades and professions as are immediately connected with it, have any thing like a correct idea of the duties of an architect. Even that class who chiefly employ architects, the wealthy, who are usually the more intelligent, have a very limited comprehension of the necessary qualifications for an architect. When, therefore, an effort is made to instruct the public how to discriminate between the qualified and unqualified, a general support by the duly qualified among the profession is expected.

No word has been uttered in the articles on technological education, against "persistent private study;" but rather, in spirit at least, this has been insisted upon, as without it the schools would be of little avail.

The interrogation of W. in the third paragraph sounds a little sentimental: "Would you drive the poor out of the profession, and close your doors against them? Should you not rather extend the helping hand to struggling merit, and by pointing out a judicious course of study to those who are not able to pursue any other, lift them to that position which nature designed them to occupy?"

The first part of the paragraph is answered by the editor, and unanimously seconded by the action of the profession. The last part, concerning nature's designs, has been well answered recently by a thorough student of nature's workings. "Nature never selects, never accepts or rejects, knows nothing about duties, nothing about fitness or unfitness. Nature simply obeys laws."

The architectural guild is not a moneyed corporation, that accepts or rejects a member on account of wealth or poverty. It should be, however, rich in lore. The "poor" *pretenders* should be driven out, and the door closed against them. But what an exodus would that be!

Whoever heard of a physician crying out for some one to "champion that class" of physicians "who owe none of their unquestioned ability and skill to any school"? And yet only a few weeks since we were told, by one who generally knows what he talks about, that "He [the architect] has far more to do with the health and usefulness and long life of the family which he shelters than the physician can ever have." This extract is from a very "practical" kind of talk, although it may not be of much weight with W., as the talker's subject was Sanitary Science, and he emphasized the necessity of more knowledge, and deplored the lack of "scientific" accuracy upon this subject. W. perhaps likes the practical Ruskin better. "Fundamental principles of true architecture" may be to some extent a "natural gift," and art may be "a gift of heaven;" but the recipients often find themselves rather oppressed than otherwise unless the aid of teachers is available to direct them in the turning of such gifts to practical account. Those of our profession who unfortunately were born before technical schools of architecture were, are sensible of the many headaches which might have been spared us if the schools had come before us.

Through this letter, if published, W. will hear, as he has desired to do, from a "self-made," who has been wishing for the past forty years that some one else had lent a hand in the making.

B.

A NEW CEMENT.

NEW YORK.

TO THE EDITOR OF THE AMERICAN ARCHITECT.

Dear Sir, — The following formula for cement has been very successfully used. The product is of very great strength; and the materials may be obtained where other cement cannot.

One heaped bushel of mortar made in the usual way for brickwork, add 3½ quarts of iron scales, 1½ quarts of molasses; to be mixed in these proportions in quantity that can be used the same day.

Yours very truly, EMLEN T. LITTELL.

NOTES AND CLIPPINGS.

THE COST OF CONTESTING A CONTRACT. — John B. Green took a contract in 1871, bids for which had not been publicly invited, to lay 48-inch pipe from Forty-Second Street to Pearl Street, New York, The first instalment falling due, Controller Green refused to pay it, on the ground that the contract was illegally let. The Court of Appeals decided it was lawful. Meanwhile the work had been completed by the city. Green then brought suit for loss of profits, laying his damages at $50,000, but in his bill of particulars only stated $24,000. The city's own experts reported that the loss was over $40,000. The city assented to judgment for $18,000 and interest, and such judgment for $25,775 has been entered before Judge Barrett, in the Supreme Court Circuit.

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INDUSTRIAL ART AT PHILADELPHIA. — The following is the chief part of the programme of an institute about to be organized at Philadelphia, with the object of furthering the industrial arts and sciences: Free public meetings, where important inventions may be illustrated, and interesting topics presented and discussed; free public lectures, having reference to the industrial arts; free classes in drawing and other useful arts; a free library and reading-room; free examination, tests and reports concerning new inventions; free advice and pecuniary aid to inventors; a free museum of models, drawings, and illustrative materials and manufactures. The project has been in process of development for two years past, and the institute is expected shortly to begin operations under the direction of Professor R. Grimshaw of the *Polytechnic Review*.

A FIRE CAUSED BY QUICKLIME. — The Ocean House at Long Branch, N.J., a new hotel, nearly completed, was nearly destroyed by fire, Nov. 25, in an unusual manner. The high tides overflowed the Shrewsbury River, and the water ran into the hotel cellar, in which were stored about thirty barrels of lime. The lime slacked and set fire to the barrels; and the building would soon have been in flames except for the timely assistance of the life-saving crew, which is stationed near the hotel.

FALL OF A HOUSE IN PHILADELPHIA. — On the west side of Eighth Street below Tasker, Philadelphia, a three-story brick house which has been in course of erection was roofed in Thursday, Nov. 22, and on Thursday night about half-past ten it toppled over with a terrific crash. It fortunately did no damage, as it fell on a vacant lot to the southward. The house was built of first-class material, but now there is nothing standing except the press-brick front. The cause of the accident was the undermining of the foundation walls by a trench that was digging for the introduction of water-pipes.

A SOLDIERS' MONUMENT FOR WARSAW, N.Y. — The New England Granite Works in Hartford recently filled an order from Warsaw, N.Y., for a soldiers' monument. The base which is over nine feet square rests upon a platform three feet high; and from four angles extend bastions, each of which supports a trophy of the war in the shape of a brass cannon six feet long. A pedestal twelve and a half feet high rests upon the square base, and upon this stands a finely-proportioned Corinthian column with cap and base; the monument being finished with a crowning figure of a soldier. The statue is of heroic size, and the monument from the ground line has an altitude of fifty-five feet. It is wholly of Westerly granite from the quarries in Rhode Island, with the exception of the figure of the soldier which is executed in bronze. The four faces of the die will be highly polished, and will bear in incised letters appropriate dedicatory inscriptions; the frieze beneath the cornice being inscribed with mottoes. This specimen of work occupied a prominent position near Machinery Hall at the Centennial Exhibition, and together with others secured for the New England Granite Works the first premium.

LESSONS IN OFFICE-WORK. — The second, third, and fourth of the evening lessons in office-work and specifications, which we spoke of as having begun at the Institute of Technology, Boston, have now been given in accordance with the scheme explained in our issue of Nov. 17. The first of these was occupied with a fuller explanation of the method of estimating by squaring and cubing attributed to M. Lesonfacher, and to a discussion of the form of specifications, in which the method of writing them in the form of a list of items, setting each phrase on a separate line, was explained and advocated as favoring the proper classification of the material, facilitating interlineation and alteration, and making it easier for the reader to find what he is looking for. This was illustrated by the half-dozen pages of outline specification, copied by the "papyrograph" process, which were distributed to those of the class who proposed to work. At this lesson were brought in a number of memoranda in regard to the conduct of office-business, as had been requested.

The next lesson was occupied with a discussion of these memoranda and their comparison with similar papers in use in England and Scotland; a new portion of specification, covering the subjects of stonework and stone-cutting, was given out; and the material given out at the previous lecture with the additional matter in regard to piling and foundations that had been collected by the class was handed over to a volunteer committee of three, to be reduced to shape, and reported upon at the next lesson. This lesson, the fourth of the series, was mainly taken up with the discussion of this report, additional specification being given out for study, and that given out the previous week being again handed over to a committee to be digested.

THE NEW ROMAN CATHOLIC CATHEDRAL, NEW YORK. — In compliance with an urgent appeal addressed by Cardinal McCloskey to the pastors of the various Roman Catholic Churches in the archdiocese of New York, collections were taken up on Sunday, Dec. 2, for the purpose of raising funds for the completion of the new cathedral on Fifth Avenue. An estimate of the amount collected, made at the office of the vicar-general of the archdiocese from partial returns, indicates that the total amount was between $18,000 and $20,000. It will require at least $100,000 to place the church in a condition to be dedicated, and about $500,000 to complete the spires and perfect the interior decoration. When the church is dedicated its revenues will be sufficient to complete it. In the mean time it is intended to hold fairs for the purpose of raising money.

STATUE OF THE MAID OF ORLEANS. — A Rouen journal announces that a stone statue, bearing on its pedestal the inscription, *Jeanne Darcques dite la Pucelle d'Orleans*, has been found in a very old farm-house situated in the village of Toussaint, near Fecamp. The statue is undoubtedly ancient; but it is so covered over with a thick layer of plaster, that its artistic merits can scarcely be judged at present.

THE APPOINTMENT OF A CONSULTING PLUMBER. — Of four cases of diphtheria in one house in Williamsburgh, N.Y., three proved fatal. The sanitary inspector, who examined the house after the deaths, found that the sewer-pipes and sinks were untrapped, and that the cellar was unclean. The inspector suggests that the license of every plumber who is found to have done any defective work be revoked, and in cases where such neglect has led to death, that he be criminally prosecuted. The Board of Health has appointed a consulting plumber to examine the plumbing-work in houses where its effect on the health of the occupants is under consideration.

IRON PIERS AT THE SEASIDE. — Iron piers are to be constructed at Long Branch and also at Coney Island. As proposed they will consist of steel beams and floor, resting upon iron columns braced to each other. To protect the structures from the sea, a breakwater will be anchored just outside of them, which will consist of long iron cylinders with projecting plates like paddle-wheels, so arranged that as a sea strikes them they will turn, thus reducing its force. The pier to be built at Long Branch will have a carriage-drive in the centre 30 feet wide, with a sidewalk 10 feet wide on each side. The work will be begun in the spring.

THE BELLS OF ST. MICHAEL'S, CHARLESTON, S.C. — In colonial times the British Government presented the colony of South Carolina a chime of bells which were hung in the steeple of St. Michael's Church at Charleston, a building which was designed by Mr. Gibson, who was, we believe, a pupil of Sir Christopher Wren, and which still is. When the British evacuated the city in December, 1782, the bells were sent back to England, where they still are. Lately an English merchant has offered to return them; and a bill has been introduced in the Senate providing for the remission of all duties upon them. What will be done with them on their arrival we do not know, for St. Michael's Church already has a peal of bells. Another story is that the bells were purchased by a Mr. Ryhineu, and sent back to Charleston in 1783, and were rehung in their old place, where they remained till they were, in 1861, removed to Columbia for safety; and when Sherman burned that city they were injured beyond all further use, and moreover two of them were stolen.

MR. J. Q. A. WARD, the sculptor, is at work upon six statues for the State House at Hartford. They will represent Agriculture, Law, Commerce, Science, Music, and Equity.

TEMPLE BAR. — An official notice is published by the city authorities of London, inviting proposals for the immediate removal of Temple Bar.

THE CHURCH AND THE ITALIAN GOVERNMENT. — Cardinal Simeoni has charged the Italian Government with violating the understanding reached in 1870 by the papal party and the government, in that certain churches had been seized by the government. The facts are these: There are 321 churches in Rome, six of which have been taken possession of by the government. Three of these, and all three unimportant, were torn down in 1875 to widen a street. The Church of St. Antonio, near Santa-Maria-Maggiore, in which there are good mosaics, is being pulled down for the enlargement of the military hospital. The chapel of St. Martha, known as the church in which Ignatius Loyola first preached when he went to Rome, is not used for divine worship. And an oratory which stood beside the Transteverine Church of St. Maria della Scala is to be used as a gymnasium for the boys of that quarter.

A PAPER CHIMNEY. — At Breslau, Prussia, a chimney fifty feet high has been made of paper. Chemical preparations preserve it from injury by fire or water.

ÉCOLE DES BEAUX-ARTS, PARIS. — There are at the *École des Beaux-Arts* at Paris in the first class in architecture, 185 students; in the second class there are 389 students. There are besides 210 students in painting, and 108 students in sculpture.

THE "DECORATIVE" MANIA. — There is no use in getting into a heat over drawing-room furniture. We shall spare ourselves much discussion if we can agree upon certain definitions. In the first place, "art decoration," as it is commonly used, is a confusion of terms. The most of our decoration has nothing to do with "art;" it is merely following a fashion, indulging in a taste for ornament, and may be guided by not the least knowledge or feeling for art. There is no art in sticking a lot of colored figures upon a jar, and putting on a coat of varnish. There is no art in painting a jar, or decorating a jar, unless the decorator is an artist. We are in danger of ruining the substance for mere show. The ornamenting of our houses is all right, if we don't babble too much about art and æsthetic culture, and fancy that we are artistic when we have not learned the first rudiments of real art. The sin of the age, especially here in America, is superficiality. And this decorative mania illustrates it. A short cut to art seems to have been discovered, just as years ago a short cut was found to painting in what was called "Grecian painting," — a disease that raged most in the rural districts, and left its "pit-marks" in so many desolate homes. Now it seems possible for everybody to be an "art decorator" in her own house, and in the houses of all her friends. In one respect we do not object to this, as we shall say presently; but the danger is, that it will have a mere run, like the fashion of a garment, and pass away without leaving any marks of real cultivation. It is a superficiality taking the place of real culture, which can only be obtained by patient study. — *Exchange.*

A JAPANESE PALACE. — The imperial residence at Kioto, Japan, which has preserved its original character for a thousand years, is about to be reduced in size, several buildings levelled, and flower-gardens in foreign style planted on their site.

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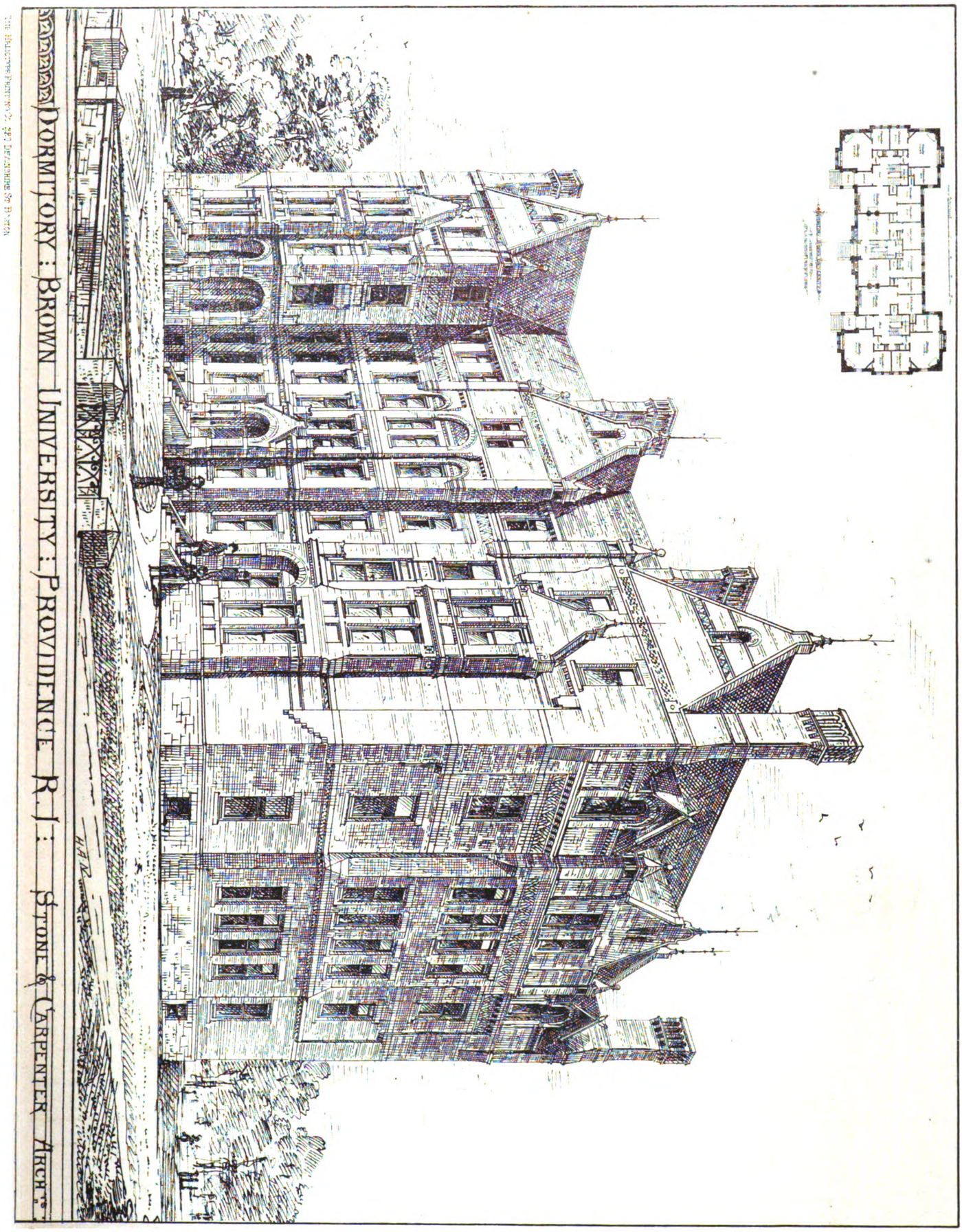

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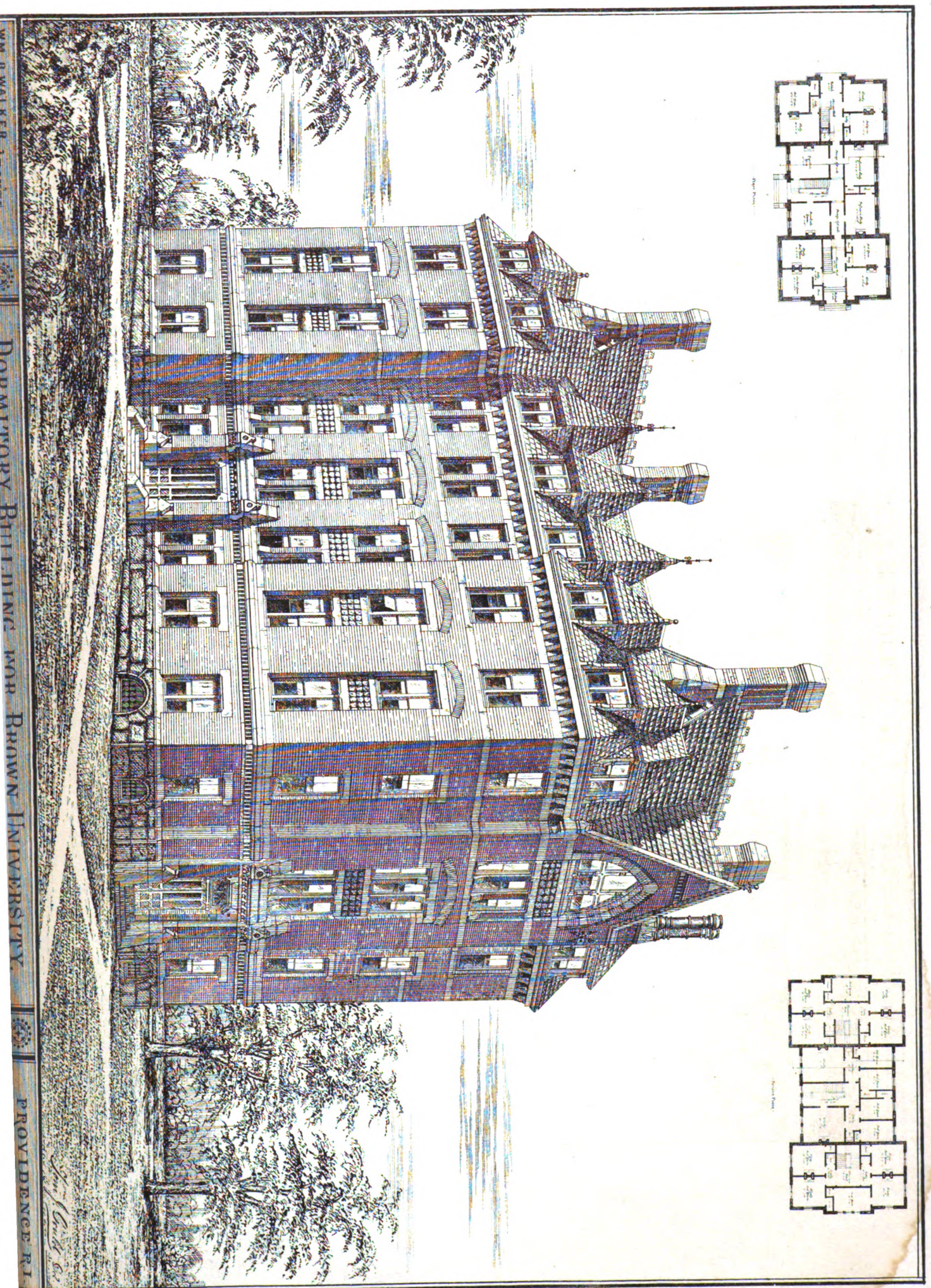

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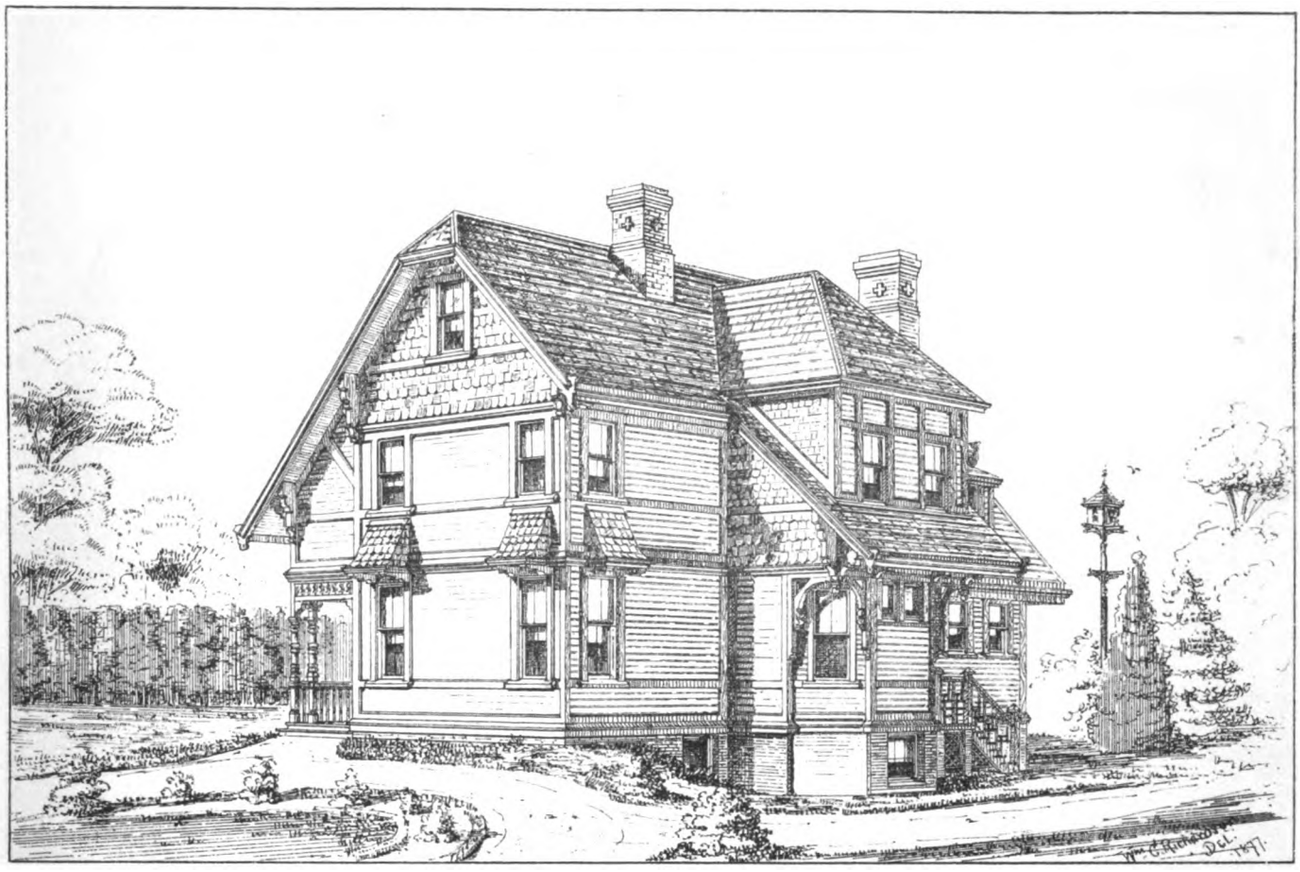
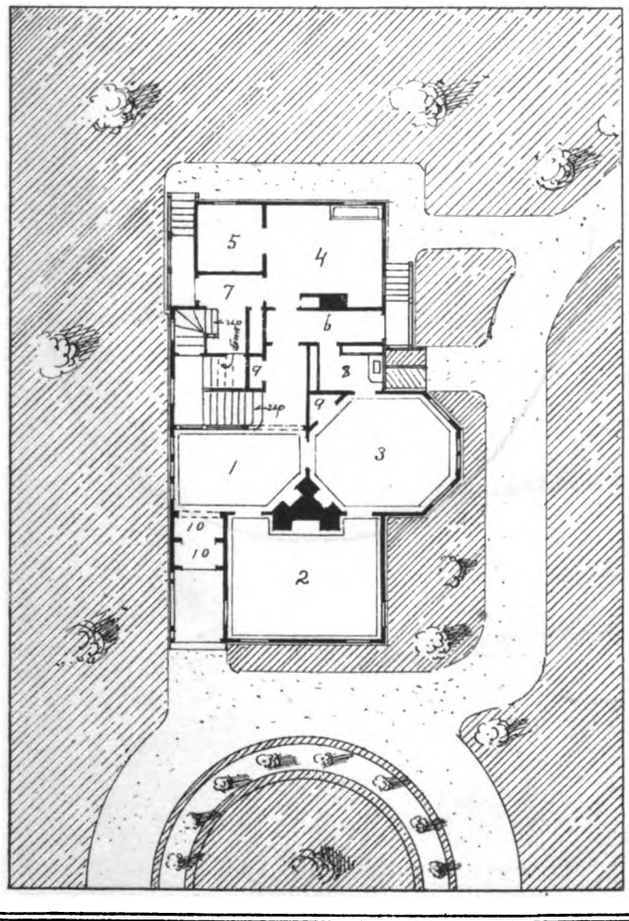


HOUSE AT LOWELL FOR A.A. COBURN ESQ. — WARE AND VAN BRUNT. ARCHTS.



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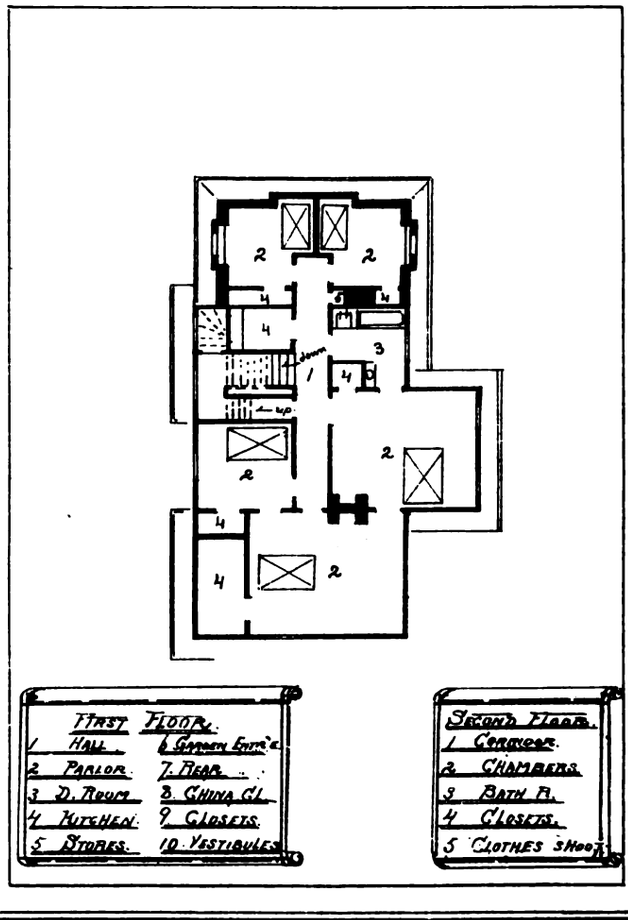

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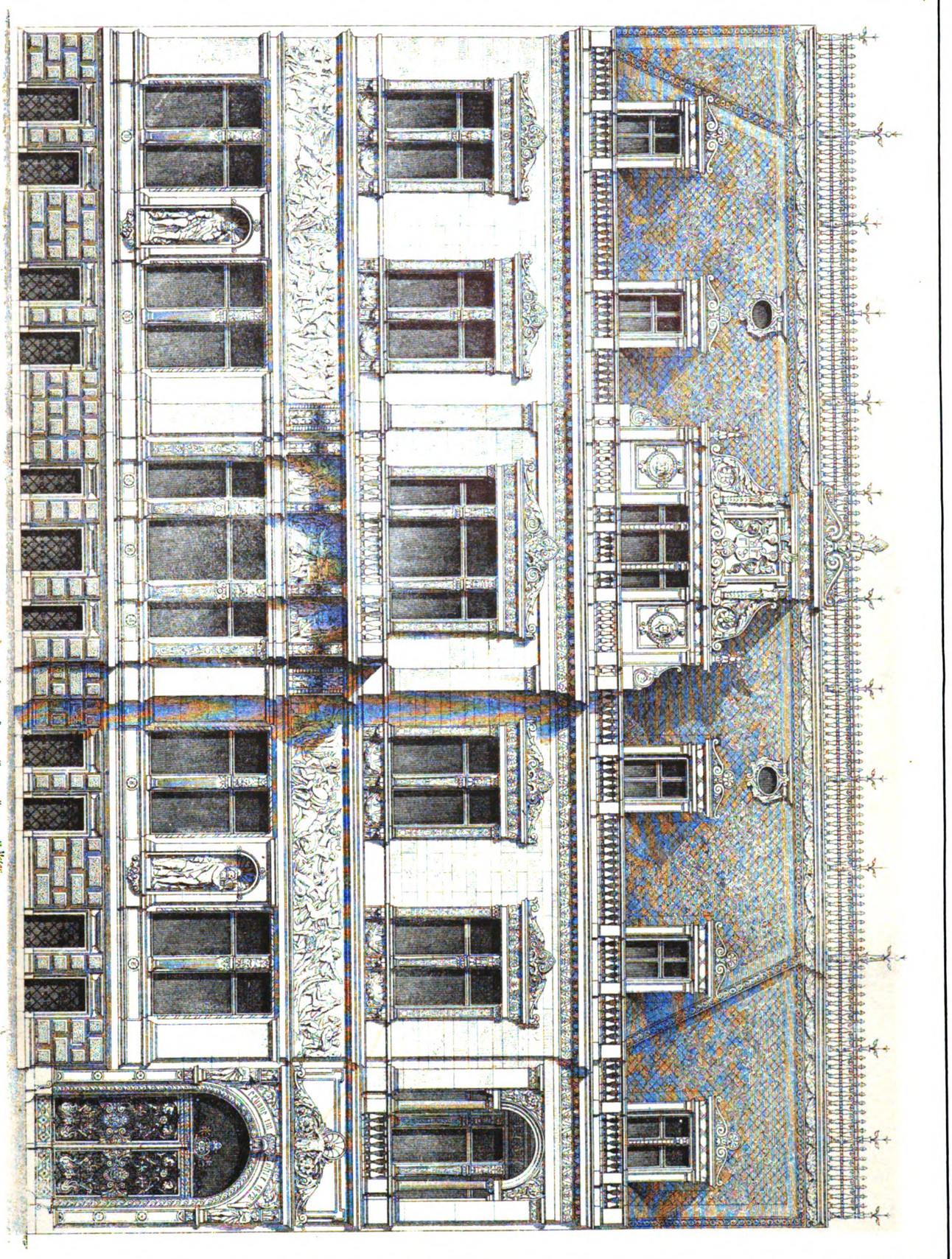
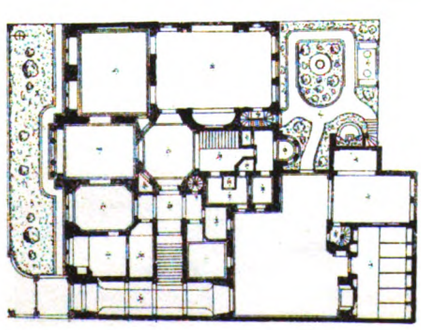
PRIVATE HOUSE AT BERLIN PRUSSIA





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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, DECEMBER 15, 1877.

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THERE seems to be a good deal of confusion in the minds of the people of Philadelphia as to what shall be done with the new Public Building. So long as the times were prosperous and taxes did not weigh heavily, they seemed on the whole to look on the building with complacent admiration, and to take pride in its splendor; but now that they are under financial oppression, the hostilities which its beginning provoked come to the surface again. One paper argues for abolishing the contract with the Messrs. Struthers, another for abolishing the Commission, and still another for abolishing the building itself. It looks as if the city had burdened itself with an oppressive undertaking; but it is agreed that a new building of some kind is indispensable; and to give up even a costly and magnificent one which has reached its second story, and begin again, would seem to be the poorest of economies. The Commissioners are accused, perhaps with reason, of having made an extravagant use of the money which they could draw without responsibility to the city. We have not seen however that there is any reason to charge them with not having used it honestly; and to throw away what they have done looks to an outsider like outdoing them in extravagance. We do not suppose there can be any real danger of this. Apparently the Commissioners had pressed their power inconsiderately in urging on the work against the general opposition and the lessened means of the tax-payers; and the contract which allows the Messrs. Struthers to force upon the city three millions' worth more of marble, whether the city can afford to use it or not, is doubtless an oppressive one. For a great city to try to wriggle out of an obligation because it is a burdensome one, is however not edifying, and we do not believe it will be done. The difficulty cannot occur again, for the courts have decided that under the new constitution the Commissioners can make no more contracts in advance of the appropriations. The course of a private citizen under like difficulty would undoubtedly be, provided he were not bankrupt, to arrange with his contractors to carry on the work at such rate of progress as he could afford, or else, paying them an indemnity for delay, to protect the work already done, get it into shape for such use as it was already fit for, and await better times; to this it may be presumed the Philadelphians will ultimately make up their minds.

AT a recent meeting the Washington Monument Society appointed a committee to urge on Congress a joint resolution empowering the commission, which was appointed last year, to begin work on the monument, and to spend the money which has been appropriated in any way they may find necessary,—in strengthening the foundations, for instance, if that is required. The Society also passed a resolution to the effect that since the people of the country had been duly advised of the design of the monument, and had voluntarily subscribed between two and three hundred thousand dollars to build it up to 174 feet, it would be bad faith now to depart from the first plan; and that they "cannot sanction any change except on the highest necessity and for the most substantial reasons." In another part of this paper we have given our reasons for saying that this notion is entirely untenable; but in any case, if it were really a question between bad faith and a bad monument, we should say that it was best to leave the Association to work out its own deliverance, and that Congress should decline to give its casting vote and the nation's money in favor of the monument. The principle of the furthering of private undertakings in Congress is objectionable at the best; and if the Government lends its hand to a Washington Monument, as it has been promising to ever since the Government began, it ought to be to one over which it had entire control, untrammelled by any good or bad faith to subscribers. Of course the real reluctance of the Society comes from attachment to their first—or rather to their already greatly modified—design. But if they fail to convince Congress, and can be led to see that the people of the country are really not interested in the thing as it stands. they may come to consider these facts as reasons substantial enough to sanction a change. A drawing by Mr. Mead of his proposed modification was shown to the Society, and received "their undivided praise." It eclipses all other designs yet proposed, we are told, which is perhaps not improbable, since the drawing, as the *National Union* naïvely says, "is about ten feet in length, and cannot fail to meet the approval of all." We need not infer, however, that even a drawing of these dimensions will yet be considered as substantial reason for a change. The Society sustain their own design by resolving that a massive obelisk without ornamentation is entirely consistent with the simple, unostentatious, and republican character of George Washington; but this hardly proves enough. No doubt an obelisk is consistent with Washington's character, and so, we may say, are a pair of cavalry boots; but it would be possible to find a form equally consistent, which would be better suited for his monument than either.

A BILL has been presented to the House of Representatives by Gen. Butler for the protection of records and other property exposed to danger of fire in public buildings. It provides that the head of the Department in charge of every such building may put into it "an automatic signal telegraph of such improved kind and description, adopted and now in public use, as is fitted and adapted to transmit signals of fire by means of an unusual degree of heat." It appoints the Commissioner of Patents, the Supervising Architect of the Treasury Department, and the Secretary of the Smithsonian Institute, a commission to examine whatever kinds of signals may be offered, and select one for the use of the Government. No doubt such appliances would be of value in public buildings, and would supplement the vigilance of the watchmen who patrol them, so long as they remained in order, though they would be less important than in private buildings where there are no watchmen. But as the New York *Times* wisely says, "What is most urgently needed is a law that will make the occurrence of fire in public buildings comparatively impossible." The *Times* calls attention to the fact that among the unsafe places is the Document-Room of the House in the Capitol, which is between the old Hall of Representatives and the Congressional Library. It has just been proposed, it says, to shelve the Document-Room with iron, for the safety of the papers; but Mr. Clarke, the architect of the Capitol, declared that the wall of the old Hall, against which the shelving was to be built, was itself only a lath-and-plaster partition. We see no proper reason, by the way, for the introduction of the phrase, "adopted and now in public use." The adoption of automatic fire-signals is a very recent thing; what if other kinds should presently be invented which should be better than any now in public use?

THE evidences of fraud which come out in the trial of the contractor for the stone-work of the new Custom House at St. Louis are important enough to deserve mention. The granite piers of the building were specified to be of solid stone; but examination by the inspectors appointed to inquire into the condition of the work shows that they are shabbily scamped. The piers have been examined by drilling into

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them; and the inspectors testified that there were large cavities in them, filled only with spalls and grouting. It is impossible by means of boring to determine the exact condition of the piers without fairly riddling them with holes enough to make them insecure; but apparently enough has been found to show that the contractor is liable for fraud. A filling of chips and mortar was found in most of the piers within from ten to fifteen inches of the surface. The testimony of the inspectors is that the piers are not safe to build upon, and that more than half of them — and there are a hundred — are filled with concrete. The Superintendent, Walsh, and Assistant Superintendent Patrick are under indictment by the Grand Jury for conspiracy with the contractor to defraud the Government. The first information for the Government was got, it is said, from discharged workmen. The superintendent has protested innocence, and impugned their testimony; but the witness of the boring is damaging. The case illustrates, among other things, the difficulty of maintaining an efficient system of supervision over work at such a distance from the central office.

VISITORS to the Centennial can hardly have helped noticing what a surprising number of attractive things bore the placard, "Purchased for the Pennsylvania School of Industrial Art," and thinking that the school would have rather a magnificent collection when it was finished. The school has been a good while organizing, but has only lately announced the opening of its courses, which are to begin at Philadelphia on the 17th of this month. It proposes to give instruction in the principles and practice of design as applied to manufactures, both by systematic class instruction, which will be extended to special industries by competent teachers, and by lectures, all of which will be illustrated by its collections. Students are to be admitted on examination, and the instruction is to be free; they will be kept busy for five days in the week, there being two hours of instruction in the morning, and two hours in the evening, with time reserved for practice between. Mr. Charles M. Burns, jun., of Philadelphia is to take charge of the instruction in matters of art, and Mr. Philip Pistor, from the Zurich Polytechnic School, of the scientific teaching.

THE WASHINGTON MONUMENT.

WE are glad to see that some one whose advice will probably command official attention, if not official deference, has given his opinion concerning the accepted design for the Washington Monument. Mr. W. W. Story has appeared, it is said, before the Congressional Committee on Public Buildings and Grounds, and has presented a new design, of which the committee has asked him to submit a model. Of the circumstances under which Mr. Story was invited to present his design, or of the character of it, we hear nothing; but any thing that fairly opens the question of a change of programme is likely to be of service. The President's recommendation concerning it, in his message, took for granted the carrying out of the first intention, and urged Congress to authorize the use of the subsidy voted last year for strengthening the foundations. It is quite likely that the President, like most other people who are interested, has never seriously considered whether the design is worth carrying out or not. Nevertheless this question is extremely important. The monument will be the most conspicuous in the land. It is a project that has been before the country in one way or another ever since the death of Washington. It was finally undertaken by private persons, with a zeal which we must admire, but under very inauspicious circumstances so far as its design was concerned: it has been at a stand-still for several years; and now, in the face of considerable distrust of its actual safety, to say nothing of its architectural propriety, Congress is urged to vote money to continue it. If it should prove to be the general opinion of those who are best qualified to judge, that the design is unworthy, it would be a misfortune to have the money given. It would appear that the present interruption was most opportune for considering whether the monument deserves to be finished at all. If we build a bad one now, it is not likely that we shall ever build a good one, for the bad one will forever block the way; and it is much easier to build a bad monument than people seem to imagine. An undertaking which may be a perpetual honor or a perpetual shame is too serious to be taken up in haste as a foregone conclusion; and now is the time for the Government to carefully consider whether it is called on to commit itself to a worthy scheme. To set aside the product of so much labor and expenditure as unworthy, is not a thing to be done without regret and careful consideration; but if it is unworthy, it ought to be set aside, for to complete it would be a national wrong.

The objection has been made to a change of design, that it would thwart the intentions of the original contributors, who gave their money for this and not for another. The scruple is honorable, but inconsiderate and unreasonable. In the first place, it subordinates the greater consideration to the less. The real excellence of a great monument that will be an example for ages is far more important than the individual preferences of those who subscribed to it. But the original subscribers, or their successors, have never expressed any preference for the accepted design: their opinion was never asked. They took the design as it was presented, and made no questions; giving for it simply because it was the Washington Monument. If they liked the design, there is not the smallest reason to consider it preferred, or to believe that they would not have liked another if it had been shown them. Moreover, the present design is not that for which the old subscribers gave their money. Its character has been entirely changed by stripping away what was essential to it. The only thing, except its bad proportion and its dimensions, which distinguished it from other dissected obelisks, — or from the other, for we are not sure that more than one such exists, — was the colonnade, or "Pantheon," about its base. The monument is better without this, certainly; but its identity is already gone.

There is another way of looking at it. It has been said that the contributors have a "vested right" in the monument, and that Congress or the Association have no right to change it. Now either the monument is a public one, or it is a private one. If it is a private one it belongs to the subscribers, and Congress ought to have nothing to do with it. In this case it is impertinent to ask them to subsidize it. The Association succeeds to the rights of the former contributors, is responsible to no one; and what it does with the design of it is a matter not of obligation but of sentiment. In this case appeals for State or for national aid or to the people of the country are out of place, and the people are only concerned with it as it is obstructive, blocking the way by doing badly what the nation ought to do well. If it is a public one it belongs to the people of the United States, and the right of individuals is merged in that of the people. The life of the people is continuous; it is the same people that it was last year or a generation ago, in spite of changes among the individuals that compose it: it is bound by the same laws, contracts, and obligations, except so far as they have been abrogated, but it is in no wise bound by its past opinions. There is on this ground as much obligation and no more to retain the form of the monument as there is to retain that of an inconvenient or unsightly post-office, because it was built with the money of a generation ago. Congress is besought and popular aid invoked, we take it, on the ground that the monument is the undertaking of the people. In this view the Association are the agents of the people, and are responsible not to individuals who have died or to any individuals, but to the general sentiment of the people as it is to-day. To-morrow they will be responsible to the people as it is to-morrow. The feeling of responsibility which is urged as a reason for not changing the design of the monument would find its more fitting exercise in ascertaining what the public, of whose money it is now proposed to secure an appropriation, would really prefer, or else of securing on behalf of the public the best thing that can be had.

But if the Washington Monument is actually a private undertaking, managed by certain irresponsible individuals, who are bent on carrying out their own notions, — a perfectly intelligible condition of things, of which we should have no right to complain, — this ought to be generally understood; and Congress ought to be let alone, and to leave them to finish their monument in the best way they can. It is no case for government interference, unless as the Government chooses to resist the defacement of its Capitol. The propriety of the nation's building a worthy monument to its first president

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still remains, and an unsuitable private undertaking ought not to be allowed to interfere with it. The public ought, in that case, to understand that their assistance is not solicited for a great national undertaking, but to carry out certain private wishes, which unquestionably are not now those of most people who have given any sober and interested thought to this matter. At present we see no evidence of any serious effort on the part of those who have charge of it to do what befits the occasion, — that is, to determine by careful consideration what is the best monument that can be put up; but only a persistent effort to force a predetermined scheme in the face of a public feeling that has greatly changed. In all the efforts that have been making these many years since first Robert Mills's crude design was accepted for want of a better, with all the money that has been spent, and the study that the Government has given to the condition of the monument, and in spite of the appropriation which Congress has once voted, there has never been any considerate effort to fix a suitable form for what ought to be and what was intended to be the noblest monumental work of the nation. We do not believe that there is any intelligent general interest in the present design whatever. The greater part of those who have seen it have doubtless accepted it as a matter of course, as they do the prescriptions of their physicians, and as they would have accepted any other design of sufficient pretence. Certainly the whole body of persons who are by profession best qualified to judge of it, the architects and other artists of the country, are united in its condemnation; and cultivated laymen who have given it any careful consideration are agreed with them. The general apathy with which it is regarded has made it necessary for those who are carrying the burden of this ill-considered project to beseech Congress to help them bear it; and there is danger apparently, that for want of an efficient protest, Congress may be persuaded. Once committed to it, the Government might find it difficult not to assume its completion. To have the monument built in a form that would be positively distasteful to the better-informed part of the community, and in which the rest could take no intelligent interest, would be a calamity. It is a thing in which every public-spirited American ought to feel an interest. We do not see how it is possible to arouse an interest, unless by such a conspicuous and carefully-considered effort to obtain the best design for it as shall in itself forestall interest by attracting public notice and eliciting public opinion. At present the nation has no interest in it, because no pains has ever been taken to make it worthy of interest. The original designer put less thought into it than went to the contriving of any other great building that we can think of; and all the effort spent on it since has been to get money.

ANTI-FIRE CONSTRUCTION.

[A paper read at the recent Convention of the American Institute of Architects by R. G. Hatfield, F.A.I.A.]

ONE of the indispensable requirements of architecture is stability, — permanence. And yet of all the buildings ever erected, how few still remain! Even that achievement of engineering skill, the Eddystone Light-house, which has bravely resisted the power of the Atlantic for one hundred and twenty years, is at last undermined and must fall. The elements in their unceasing action sooner or later triumph over the proudest works of man. Of the elements at work in this destruction, there is none so active, so successful, as fire. With what fiendish relish does it lick up the combustible, and ruthlessly tumble the residue in shapeless ruin! History teems with its work of desolation. The cities of the Old World have all sadly suffered by its ravages: I will refer to one of them.

The great fire of London, in 1666, burnt for three days, destroying 13,200 houses, including many fine public buildings. The loss by this fire, if computed by present values, would amuont to at least $100,000,000.

The city of New York has suffered by at least three great fires. One in 1835 destroyed 600 warehouses, which together with contents were worth $20,000,000. Another in 1839 destroyed property to the amount of $10,000,000; and a third in 1845 destroyed 300 stores and dwellings, valued at $6,000,000. Charleston in 1838 suffered by a fire which destroyed 1,158 buildings, covering 145 acres. Pittsburgh, in 1845, lost by fire 1,000 buildings, valued at $6,000,000. Albany, N.Y., some years since lost in steamboats and buildings $3,000,000. St. Louis, in 1849, lost $3,000,000 in steamboats and buildings. Philadelphia, in 1858, lost 300 houses. In 1845 two-thirds of the city of Quebec, comprising 2,800 houses, were swept away by fire. The city of St. John's, Newfoundland, repeatedly damaged by fire, was nearly all destroyed in 1846, when 6,000 people were rendered homeless. Troy suffered severely in 1862. Portland, in 1866, lost $9,000,000, including the loss of 1,600 buildings. Chicago in 1871, and Boston in 1872, were devastated to the extent of more than $200,000,000; and quite recently a devastating fire has almost entirely destroyed the city of St. John, N.B. But these marked fires do not alone measure the work of destruction; much is due to the smaller fires, which make up by their frequency what they lack in proportions. Constantly at work, little by little, year by year, the aggregate of ruin they accomplish is fearful.

A record kept by the New York *Insurance Chronicle* shows that the loss by fire in the United States and Canada in 1876 was $75,000,000, and in the previous year it was $86,000,000. This record is doubtless trustworthy, as far as it goes; but I am assured by competent authority that the loss during the last ten years has not been less than $100,000,000 per annum, not including the two extraordinary fires of Chicago and Boston. What a fearful havoc! Is there no remedy?

The losses in the United States and Canada during the last twenty-five years aggregate an amount which would have sufficed to have rendered all the buildings approximately fire-proof. A few figures will show this. The United States census for 1870 gives the value of the real estate of the country, but not the value of the buildings alone. This, however, may be approximated. From an estimate made upon the property within certain limits of the city of New York, the value of the buildings was found to exceed considerably the value of the ground built upon. The buildings in the rural districts, however, are of much less value than the land, perhaps not half. A fair average for the two — city and country — would perhaps be one-third the value of the real estate. The census for 1870 puts the value of the real estate at about $9,900,000,000, one-third of which, $3,300,000,000, then, is the value of the buildings.

This result may be tested by estimates upon another basis. It is shown in the last report of the National Board of Fire Underwriters, p. 27, that the insurance effected during the last five years averages about $5,170,000,000 per annum; and it is shown by the records of the New York *Chronicle* that not more than half of the losses by fire are covered by insurance: hence the $5,170,000,000 insured is only half of the insurable property of the country; or, the value of the property of the United States and Canada, liable to loss by fire, is not less than $10,340,000,000. This is the value, not of the buildings alone, but of the buildings and their contents. To ascertain what portion of this is invested in buildings, it is shown by the New York Board of Fire Underwriters in their last report, p. 23, that in an average of the losses for the past eighteen years, the portion on buildings was about one-third of the whole. Taking this as authority in the matter, one-third of $10,340,000,000 is $3,447,000,000 for the value of the buildings in the United States and Canada, which cannot be far from $3,300,000,000 for the United States alone, as before shown.

Of the $100,000,000 annual loss, one-third may be taken as that which was invested in buildings; and, had the buildings been of a character to resist the flames, a large part, perhaps two-thirds, of the loss upon their contents would have been saved: thus $\frac{1}{3}$ in buildings and $\frac{2}{3}$ of $\frac{1}{3}$, or $\frac{1}{9}$ of the contents, or together $\frac{4}{9}$ of the whole loss, could have been avoided by having more perfect buildings; or, of the $3,447,000,000 invested in buildings, there is an annual loss of nearly $78,000,000 due to deficiencies in buildings. This is more than two per cent of the value of the buildings, an amount which would in twenty or twenty-five years be ample to render all our buildings approximately fire-proof, and would not only save more than three-fourths of the present loss in material, but that also which is caused by interruption to business; and, in many instances, avoid the loss of life, and consequent distress to survivors.

Painful instances of loss of life by fire through deficient buildings are still fresh in our memories. The Brooklyn Theatre and the St. Louis Hotel cry aloud for reform in building. Whatever may be said of the inexpediency of expending money upon ordinary buildings to avoid damage by fire, there certainly is no good reason why, at whatever cost, places of public resort should not be made safe. As life is more precious than money, so no money should be considered wasted which is required to protect life. It was lately shown in the Chicago *Investigator*, that no less than 156 theatres have been burned in the United States since the year 1800; and of these 119 were burned since 1850. Similar statements, though perhaps not quite so disastrous, might be made of hotels and other public buildings. The government of a country should be held responsible for life sacrificed in this manner, as well as for that of those who die by neglect of sanitary precautions. The owners of buildings of public resort should be compelled by rigid law to render their property secure from destruction by fire.

In the construction of buildings, the materials most in use are brick, stone, iron, and wood. Brick above all the others is that which possesses fire-resisting qualities in the largest degree. It has been in use from the earliest ages; it is prominent among the materials of ancient buildings. The Pantheon, the only entire ancient building of Rome, is of brick. The marble with which the brick walls were incrusted has long since disappeared. The metal which covered the roof was stripped off for other use. The only

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opening for light, the eye of the dome, nearly thirty feet in diameter, has been uncovered, exposing the interior to every storm; and during the nineteen centuries of its existence, it has been subject to repeated conflagrations resulting from the wars which so often desolated Rome; and yet, through all these vicissitudes, the Pantheon still remains in such good condition that it serves as one of the churches of the city. Its durability, however, is due not alone to the character of the material of which it is constructed, but also to its form, the strongest known, a cylinder.

Stone, though inferior to brick, is far superior to iron in its fire-resisting qualities. Granite when exposed to intense heat will crack and splinter freely; marble is quickly reduced to lime; sandstones disintegrate: only those stones which are of volcanic origin may be safely trusted in the fire.

The extensive use of iron as a material of construction is of recent date. Fifty years ago it was but little used. One of the principal reasons for introducing it was its fire-resisting character. Gwilt, in his Encyclopædia, p. 494, art. 1767, edition of 1842, in speaking of iron says, "The security afforded, not only for supporting weight, but against fire, has of late years very much increased the use of it, and may in many cases entirely supersede the use of timber." The experience of recent years however, especially at Chicago and Boston, has materially lessened confidence in its fire-resisting character. Indeed, its power to sustain weight when subjected to great heat has been shown to be quite limited. It is capable of sustaining, in an intense fire, neither compressive, tensile, nor transverse strain, to any useful degree. Its untrustworthiness was shown at least two hundred years ago; for Evelyn says of the great fire of London in 1666, "The vast yron chaines of the Cittie streetes, hinges, bars and gates of prisons, were many of them mealted and reduced to cinders by ye vehement heate."

To protect hollow iron columns it has been proposed to secure the passage of a current of air through them. An experiment to test this was made upon a 1½-inch pipe which was subjected to heat at the middle while a strong current of air was maintained through it. It was pulled apart by hand in four minutes after the fire was applied.

All metals transmit heat rapidly, — a fact which may account for the rapid loss of strength in iron when subjected to fire. If iron be used for floor-beams, arch-ties, or for posts, or for any purpose which exposes it to strain of any kind, it should be protected by an incasement of some slow-conducting material, such, for example, as brick, terra-cotta, or gypsum; although this latter material is active in rusting iron, and therefore should not be allowed to come in contact with it. Where gypsum is to be used, a good coat of lime-whiting previously applied to the iron will protect it from the action of the plaster. Mr. Hornblower, architect, of Liverpool, has patented a system of protection to iron beams by means of earthenware jackets and concrete; and Mr. P. B. Wight of Chicago, Fellow of the Institute, has patented a system of protection to iron columns by an enclosure of plaster and other fire-resisting material. These and other systems of protection are just so many concessions to the now well-established fact, the non-fire-resisting character of iron.

Of the four principal materials used in construction, wood is generally supposed to be that which has the least power to resist fire. This idea in general is correct, and yet under certain circumstances wood will resist fire longer than iron. Firemen are reluctant to enter a building on fire when it is known that the supports are of iron, yet do not hesitate where they are of wood. This apprehension of danger from iron supports, the growth of experience, plainly proves the superiority of wood over iron as to a fire-resisting quality.

A floor of wooden beams placed apart in the usual way has but little fire-resisting quality. The fire, aided by a free current of air between the beams, rapidly consumes them as so many pieces of well-placed kindlings. This defect in the construction of wooden floors has led to various devices, one of which is the use of plaster or gypsum, which is thickly spread upon the lathing at the bottom of the opening between the beams, and also extended up on each side. This forms a good filling, effectual in preventing the draught of air; but it has been found to induce rapid decay of the timber, and is therefore a failure.

In the use of ordinary deafening, concrete, plaster, or any similar filling, it is requisite to increase the size of the floor-timbers sufficiently to sustain safely the weight of this filling. The fillings above named are a dead weight upon the floor. If some filling be used which would sustain itself, such for example as wood, or if the intervening spaces be filled with so many additional floor-beams, these would not only sustain themselves, but would contribute to the general strength of the floor; or, the floor not needing additional strength, the beams could all be reduced in depth to the required limit of strength. An arrangement of this kind produces what is termed a solid timber floor, upon which, there being no interstices for the passage of air, the fire, retarded, acts only in slowly charring the surface. Such a floor would resist the action of fire for many hours, and would be effectual in preventing the spread of it.

But wood is subject to decay; and for this reason is inferior to iron, which is deteriorated by rust generally in a very small degree. Where iron can be protected from injury by fire, it is far superior to wood. For general building purposes, however, wood, if protected from decay, is superior to iron. Our want now is some effectual ready method of preventing decay in wood. Until something better is offered, floor-beams and posts may be subjected to the Kyanizing or to the Burnetizing process, which are claimed to be effectual. It has been proposed, after wood is Kyanized, to coat it with silicate of soda as a protection from fire. Experiments on a large scale in this direction are desirable, and might well be undertaken by the General Government at Washington.

Investigations lately made show that the archives of the War Department are exposed to destruction by fire, being lodged in buildings of a frail nature. Self-protection may possibly inspire the authorities to make the indicated tests of wood, from which results may flow of great importance to the country at large.

In planning buildings to endure, it is required that the walls and partitions, of ample thickness, be made of well-burned brick put together with the best of mortar, and that the floors, as far as practicable, be also made of brick, vaulted. Where this is not practicable, owing to the lateral thrust of the vaulting, then the floors should be of prepared timber laid together solid, and coated beneath with an inch of plastering on wooden lath coated with the silicate of soda; the plastering largely composed of plaster or gypsum. The floor timbers should be attached to each other by spikes or dowels, and lodged at the ends on brick ledges, corbelled out from a good depth below, and secured to the walls with iron anchors. The ends of the beams should be cut inclining, so that while of full length at the lower edge they will be an inch distant from each wall at the top edge; and this space between the wall and the beams should be kept open for ventilation. The floors at or below the level of the street should always be vaulted with brick; for here it will not be difficult to secure sufficient buttressing to the arches, and here, where the furnaces for heating are located there is the more need of protection. All flues for heating should be of ample size and lined with earthenware pipe. Stairways usually of wood afford means for the rapid spread of fire from the lower to the upper stories. Where practicable these should be of brick and stone; and the stairway of each story should be provided with doors by which to isolate it from the other stairways. All partitions should be of brick, especially those about a stairway or an elevator. All shafts for elevators or for light or air should be provided with doors at each floor, in order to cut off when required all opportunity for a current of air. Wooden furring on walls is highly dangerous. Where used it should be provided with bars of filling at proper intervals to prevent draught and, incidentally, the circulation of vermin. Partition walls of brick should, when possible, take the place of lines of posts and girders, that the apartments may be reduced in size; and the openings in the walls should be provided with doors and shutters by which to isolate the apartments.

If buildings were constructed in this manner, a fire would seldom extend beyond the apartment in which it originated.

To protect the exterior, all wooden cornices, dormer windows, and the like should be avoided. Roofs should be of slate or metal laid upon a good bed of cement concrete. The walls should be extended well above the roof, and coped with stone or iron. The exterior walls should all be of good solid brickwork. If, however, there be iron posts as those of a store-front, they should be filled in solid with brickwork of ample size to carry alone the weight of the upper walls.

Buildings of the character here indicated could be erected at a cost not to exceed fifty per cent additional to that of the average city building, and in a city of such buildings damage by fire would be reduced to a minimum.

THE ILLUSTRATIONS.

COLLEGE BUILDING, COLORADO SPRINGS, COL. MESSRS. PEABODY AND STEARNS, ARCHITECTS.

THE central portion of this building is now begun. The walls are to be of pink stone with light stone for the finish. The town of Colorado Springs is not far from Pike's Peak.

HOUSE FOR MR. G. C. WILKINS, BALTIMORE, MD. MR. J. APPLETON WILSON, ARCHITECT.

This house is 24′ wide and 66′ deep, built of Baltimore press brick laid in black mortar, with patterns of black brick, and a very few tiles. The stone caps, sills, etc., are of Indiana oölitic limestone of a light color, rubbed. The roofs of the dormers and oriel with main roof are covered with black slate with belts of red. The second story overhangs five inches in front and on the side; a wrought-iron balcony projects from the second story level in front. The house is plastered throughout with "sand" finish. The front and vestibule doors, stairway, and hall are finished in ash; the remainder of the house in pine, painted. Wood mantels, tile linings, and hearths are in all the principal rooms.

DESIGN FOR A RUSTIC SHELTER ON THE PALISADES. MR. CALVERT VAUX, ARCHITECT.

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Y^e OLD INN, NEW JERSEY. SKETCHED BY MR. J. CLEVELAND CADY, ARCHITECT.

See the following article on "Some Features of the Dutch Farm-Houses of New Jersey."

A STREET VIEW IN LILLEBONNE, NORMANDY. SKETCHED AND ETCHED BY MR. GEORGE SNELL, ARCHITECT.

SOME FEATURES OF THE DUTCH FARM-HOUSES OF NEW JERSEY.

[A paper read before the New York Chapter, A.I.A., on Dec. 4, by J. Cleveland Cady, F.A.I.A.]

Of late our attention has been frequently directed to that phase of domestic architecture styled Colonial, fine specimens of which are frequently seen in New England and in some other portions of our country. Those who have given most attention to it have been surprised and delighted with its refinement, air of elegance, its domestic character, and also in many cases its very choice carpentry. When, however, we consider those for whom these houses were built, and the people who built them, we are not surprised; since those for whom these fine homes were erected were often very wealthy, — many having amassed great fortunes in the India trade, others in successful whale-fisheries, and others still having inherited fortunes from English ancestors. These people lived luxuriously; their houses were places of great hospitality, abounding in merry-makings and family and social gatherings of the liveliest sort. In many cases they brought their plans for building from the mother country; in others they were devised by mechanics who vividly remembered the old country houses. Indeed, in the matter of mechanics they seem to have been peculiarly favored, there being in the country a large number of skilled workmen, both English and French, who had come over with the armies. I remember being very strongly impressed, when quite young, by a few houses in a Connecticut village that possessed unusual character and interest. Subsequent investigation revealed the fact that a portion of Lafayette's army was quartered near the town one winter, and some Frenchmen who had come over with him had been induced to settle there later, and resume their old trade of house-building for the benefit of some of the more aristocratic families of that day.

In the region of Northern New Jersey, however, we find a very interesting class of old houses that were built without such peculiar advantages as have been mentioned, their owners neither possessing wealth nor being able to secure very skilled mechanics; and yet for interest and comeliness they put to blush the average house of modern build.

Let us look for a moment at the contrast that is continually presented to one passing through this part of the country. The Dutch houses are broad (seldom lofty); horizontal lines predominate; their roof masses are simple, expressive, and often graceful. The houses never seem ambitious or pretentious; the big chimneys, broad, well-lighted doorways, and spreading roofs suggest hospitality and good cheer. Moreover, the buildings are often singularly well adapted to their sites. The modern houses which one sees in contrast (and they are not sinners above others) are usually tall and gaunt, as if in their ambitious haste they had, like many precocious children, grown too fast for their strength; their lines often suggest "Excelsior" as their key-note, but rarely the spreading shelter of the home-like roof. The roofs are as broken as possible, bristling with dormers, iron crestings, turrets, and, if means will possibly permit, a tower. The chimney is generally a slender, unimportant feature, suggesting air-tight stoves (which are usually accompanied by a poor state of health that precludes hospitality), and the matter of site seems less regarded than the desire to be a little smarter than their neighbors. No wonder that people of taste moving from town to this part of the country eagerly seek for an old Dutch house; it is only to be regretted that they so often spoil them in the additions they make.

The builders of the old Dutch houses were not people of any special taste or refinement. They were of the class Washington Irving has so comically described in his account of the settling of Communipaw. I have seen a collection of veritable descendants of these early settlers at work preparing the foundations of a house, and felt that Irving's description was not a whit exaggerated, — such funny, droll Dutchmen, so oddly attired, and so ungainly in their appearance and action. Yet their very lack of resources seems to have saved them from many of the abominations which people of a later date have fallen into. It was difficult for the Dutch settlers in those days to obtain good mortar, and so the masonry of the first story, which was usually built of stone, was laid in Jersey mud or clay. This involved the necessity of giving the walls careful protection from storms: so where the roof came over the wall it was often made to project several feet beyond with a graceful curve, forming in some cases the roof to a piazza; and where at the gable-ends a perpendicular wall of wood-work surmounted the stone, it overhung considerably. Very likely they did not think when exercising these wise precautions that they were adding grace and beauty to their roofs as well as picturesqueness to the walls. The gambrel or curbed roof prevailed; quaint in its lines, which consisted of a double slope on each side, the ends being carried up as gables. It was often of very pleasing proportions, and varied according to circumstances. The chimneys were of great size, as was necessary for the huge fireplaces that were filled with the cheerful blaze of the burning logs. The front door was broad, and usually divided horizontally in the centre. The origin of this division I have never ascertained. Its value nowadays seems to be in preventing the too free entrance of tramps to country houses, while allowing a full play of light and air. The door had heavy fastenings and hinges of wrought iron, often interesting in design; the side lights and head lights were framed in a sort of traceried sash of light flowing pattern that contrasted agreeably with the massive solidity of the door. The glass itself was interesting though rough; the sash-work sometimes contained bull's-eyes of oval or egg shapes, that were much more effective than those that are now in such vogue among our stained-glass workers. The piazza work was lighter than that of the present time, and less clumsy, and yet abundantly strong; it often embraced seats that seemed inviting. The color of these houses was usually quiet; the first story being of brown stone, the gable-ends and carpentry painted an olive or drab. Very often, however, this wood-work was in white, but there was so little of it that it was not glaring. The all-spreading roofs took on the gray that time with its toning hand, its lichens and mosses, adds to unpainted shingles.

It has been said that these houses were often well adapted to the site. In Bergen County as you journey north, you suddenly come to a little but steep hill: at your right is an old house evidently built for a tavern; its southern front is at the base of the hill, and is some three stories high; its northern end is on the summit of the hill and is about four feet in height, the shape of the house being something like a V somewhat opened, the short point resting on the hill. The practical advantages were, that as the portion to the south contained the most of the windows, all the stories shared this advantage; but on the north the down-sloping roof and uprising ground gave complete protection from the storms of winter. The artistic interest is in the spirit and picturesqueness of the lines, broken slightly as they are in their downward or upward course, the lines of the hill being one factor of the combination. The building is one to excite the admiration of any one fond of the picturesque. It is a picturesqueness gained not by "making it up," or working hard for it, but by using common sense and good judgment in studying the site and adapting the house to it. Were the old house to be pulled down and some one to build again, very likely they would build upon the hill, or pull the hill down to a dead level or "nice grade," and then build a senseless and commonplace dwelling that would have no particular connection with the landscape; instead of the cosey dwelling with its front extended and open to the sun, its back bent to receive the north and wintry storm, and the whole seeming to have grown out of the hillside, and to be a part of it.

For a glimpse at the interior of one of these houses, come with me in imagination to a friend who has a possession of this kind that he values greatly. We enter a good-sized hall, furnished very much like the rest of the first floor, and connecting with the drawing-room by a large opening which is partially draped. This hall which is free from staircases forms practically an extension to the drawing-room in summer, but in winter becomes merely a vestibule. The ceilings of the first story are supported by massive timbers which have never been painted; and they and the wood-work they carry possess a beautifully soft fawn-color, the result of age, and probably also of very many scrubbings. In the centre of one side of the drawing-room is an immense fireplace and chimney, whose form rises to the ceiling, and whose brass dogs bear heavy logs. The fireplace has its jambs, and, indeed the whole breast up to the ceiling, covered with old Dutch tiles of a purplish hue, a great number of them in all, and far more droll in design than the modern imitations. On either side of this fireplace is a cupboard for choice glass, crockery, or books, the closets being glazed and having quaint tracery to hold the glass as in the case of the front door. The shelves are prettily curved in plan, and interspersed among them are convenient lockers, drawers, and secret hiding-places for valuables; a most entertaining piece of ingenuity and nice carpentry. The windows are deeply set in thick stone walls, the sash being rather heavy and holding small lights.

As we sit in these rooms, and reflection and curiosity are stimulated, we realize that they are not large, yet they seem extremely spacious; and we are led at once to investigate from whence this effect arises. The first assignable cause seems to be the low ceilings (about eight feet), which not only give an air of cosiness, but increase the breadth of the rooms; next we cannot but conclude that the very small trim architraves, etc., must greatly increase this effect; then the small sash-lights, and lastly, perhaps, the general good sense in furnishing.

As has been mentioned, the finish is very small, and the mouldings everywhere simple and delicate. Machine-mouldings were happily unknown in those days; and the mouldings, being worked by hand, were simpler, smaller, and vastly better than the elaborate and untamed members that machinery now turns out so

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plentifully that apparently no family feels that they need be without them.

As we take a final survey of this homelike cosey interior, we see that the timbered and ceiled ceiling is far prettier in color and light and shade, than any expanse of plaster could be; that the large fireplace suggests an ample allowance of the greatest of all creature-comforts; that the low ceilings give a feeling of cosiness, and seem to frame in the pretty objects of the room as high ceilings could not; and that the simplicity and smallness of such details as mouldings, etc., have increased the apparent size of the place very greatly.

For one, I feel that both outside and inside of their dwellings, the old Dutchmen can teach us much that is sensible and interesting.

CORRESPONDENCE.

THE LONG ISLAND HISTORICAL SOCIETY'S BUILDING. — ASYLUMS FOR THE PAUPER INSANE. — MEETING OF THE NEW YORK CHAPTER, A. I. A.

NEW YORK.

THE uncertainty about the Long Island Historical Building is nearing a solution, the Building Committee having resolved to have all plans sent in on or before Jan. 1. As a matter of fact the majority of the designs are either delivered or ready for delivery by the architects. It will be an irregular close competition: seven or eight architects, who had either sent in drawings or had notified the society officers of their intention to do so, have been placed on the list, and the name of Mr. Eidlitz has been added by a special vote of the committee. As there is no official guaranty that the best or any design out of those sent in will be carried out, Mr. Eidlitz will not break his rule of refusing to participate in competitions of this class. A competition in such a case as this is manifestly absurd. There is nothing novel in the requirements; a small meeting hall, a library, and a museum, with the necessary ante-rooms, are to be provided on a 70 x 90 feet plat of ground. Cheapness is essential, as the society managers expect to get the building for about $75,000. A dozen architects could be selected here, any one of whom could thoroughly and satisfactorily meet the demands of the committee and the society. Instead of following this course, the yet unchosen committee-men are clamorously besieged by a dozen or more aspirants, each anxious to submit his design on speculation. The committee have consented to look at the works, and thus a competition is instituted. Had the problem been a difficult or novel one, such for instance as a Stewart Memorial Church or a Saratoga Monument, where the expenditure of large sums was at stake, a competition properly conducted would have been justifiable. But the Historical Society competition becomes important simply by the efforts of the architects to make it so, and its conspicuousness will be in failure rather than in success. One step further, and competitions for a row of brown-stone fronts or possibly a tenement-house may be met; but when as at present, plans may be secured gratis, provided the duty of superintendence is given, there would hardly seem to be room for under-cutting competition.

The architect of the Department of Charities and Correction, Mr. Joseph M. Dunn, is busy upon a series of plans looking to the better accommodation of the insane among the city paupers. The asylum on Blackwell's Island is to have a new story added; the asylum on Ward's Island will have a new wing, 65 x 180 feet, and four stories high; while on Hart's Island, farther up the river, an entirely new asylum is building. The buildings are to be built of the trap and granitic rock quarried upon the islands by the prisoners, by whom also the bulk of the work will be done.

A Chapter meeting was held Dec. 4, at the Institute rooms, R. G. Hatfield in the chair. The feature of the gathering was the reading of a brief paper by J. Cleveland Cady, founded on notes and observations among the old Dutch farm-houses in New Jersey and elsewhere. In the discussion which followed, Mr. Haight, Mr. McKim, and other members recalled observations which they had made, and measurements taken of similar old buildings; and with sketches upon the black-board the afternoon session was very agreeably filled. W.

THE PALESTINE EXPLORATIONS.

[From the Opening Address of Mr. Barry read before the Royal Institute of British Architects.]

I MAY not pass on without allusion to another work of exploration of the greatest interest, and which has been pursued and persevered with under much difficulty and disappointment. I allude to the "Palestine Explorations." It was early felt, that before exploring particular spots in detail, it was almost essential to have a far more correct map than existed of the whole of the country both east and west of the river Jordan. The east side was undertaken by an American committee, who have not, however, made much progress. The west side was undertaken by our own countrymen, and an excellent map has now been nearly completed, after a persistent labor of some years. A tract of country of 7,340 square miles has been accurately surveyed, — the hills shaded on the spot, — on a scale of one inch to the mile; and the map, as accurate as ordnance maps are, is the gratifying result. The sites of about eight times as many places have been identified and marked on it as are shown on the most correct maps previously existing; while, in addition to the land survey thus made, careful measurements have been taken, and drawings made, of a large number of architectural ruins of all ages, the greater part of which have now been seen and measured for the first time.

As the American society has made little or no progress, I am informed that, should their funds enable them, our own "Palestine Exploration Committee" will now commence a similar map and record of the country on the east side of Jordan. The extremely interesting excavations by Lieut. Warren, undertaken also at the instance of the Palestine Committee, have been obliged to be suspended for the present. They were, however, so very promising, and they had already afforded so much curious information, that it is to be hoped they may be resumed. With regard, therefore, to all those laboring in distant lands in matters of such great interest to us here as architects or archæologists, and remembering how earnestly Dr. Schliemann assured us that one of the greatest incentives an explorer can have is to feel that he is not alone, but has the interest, regard, and good wishes of sympathizers all over the world, I may, I am sure, as last year, on behalf of this Institute, wish "God speed" to all who thus are laboring abroad.

TESTING COVERINGS FOR STEAM-PIPES.

THE Trinity College Building Committee have lately investigated the properties of several of the many kinds of coverings for steam-pipes, a matter which is of such interest to the profession that we reprint from the Hartford *Courant* the account of the test.

"After the reception of tenders by various competing firms for the covering of the pipes, which embrace some eight thousand lineal feet, and include pipe varying in size from two to six inches, the superintending architect, Mr. F. H. Kimball, visited New York for the purpose of a personal examination of work which had been done by different parties; but opinions conflicting greatly as to the merits of material used, it was deemed best to make an exhaustive test upon a portion of the pipes in one of the college blocks. The work of testing the pipes to discover leakages having been completed a week or ten days ago, samples of pipe-covering were put on by the following companies: the H. W. Johns Manufacturing Company, the Asbestos Felting Company, the United States and Foreign Salamander Felting Company, and the Chalmers-Spence Company, all of New York. The samples having been placed around a six-inch pipe to the satisfaction of the respective competitors, a wooden box was constructed with an open bottom, and two of the sides cut in a semicircle to fit closely to the covering. A light of glass was fitted in one side of the box, through which a thermometer could be seen suspended from the top until it hung within an inch of the pipe-covering. The box having been placed on the sample, all cracks were securely plastered up so that it was perfectly air-tight. It was first put over the covering made by the H. W. Johns Company. This consisted of one and one-half inches of asbestos mixed with other ingredients upon a lining of heavy felt paper laid next the pipe. During thirty minutes in which this test was made, the thermometer rose from 97° to 103°. The covering of the Asbestos Felting Company was next tried. It was two inches in thickness, and in ten minutes the thermometer rose from 97° to 102°, and in half an hour from 97° to 105°. The air space covering of the Chalmers-Spence Company was then tested. Over a one-inch air space a one-inch plastic covering composed of various non-combustible and non-conducting materials was placed. At this test, the thermometer which marked 90° when the box was put on would not rise above 94°, the time allowed being thirty minutes. A test was also made of the 'plain' covering manufactured by this firm. It consists of one and one-half inches of the composition used in the first method, without the air space. During thirty minutes when it was tested the thermometer rose from 97° to 102°. The Salamander Company's covering was then tried. It is made by a coating of one and one-half inches of cement. In this test for which the same time, thirty minutes, was allowed, the thermometer rose from 97° to 102°. All the above tests were made under a pressure of ten pounds of steam. To condense the results of the various trials, the following table is given: —

Covering.	Thermometer when put in.	Rise in 30 min.
H. W. Johns Manufacturing Co.	97°	103°
The Asbestos Felting Co.	97°	105°
The United States and Foreign Salamander Felting Co.	97°	102°
The Chalmers-Spence Co. 'plain'	97°	102°
The Chalmers-Spence Co. 'air space'	90°	94°

"It was demonstrated that the 'air space' covering was superior to the other methods tried; and after consultation and a consideration of the merits of the work shown in sample by each of the competing firms, the contract was awarded by the committee to the Chalmers-Spence Company of New York."

FIRES IN 1877. — It is said that in spite of there having been no great conflagrations, the losses this year will be ten per cent larger than the losses last year.

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MAHAN'S INDUSTRIAL DRAWING.

TROY, N.Y.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

Dear Sir, — Having had my attention recently called to an article in your magazine criticising the revision of "Mahan's Industrial Drawing," I am unwilling to let it pass unnoticed. Will you be kind enough to publish this reply, on the principle of fair play?

The writer says, "The change of notation is a change for the worse, so that small Italic letters in the plates refer in the text sometimes to capitals and sometimes to small letters." The only change made in the notation was to substitute small letters in place of the capitals used to mark the horizontal projections of points, so that a point would be lettered a a', instead of A a'. I have simply changed the notation so as to conform to that in common use.

In the new chapter on Shadows, capitals are used in the text to refer to small letters on the plates, in this way: the point *a a'* is spoken of as the point *A;* or the line *a b* — *a' b'* as the line *AB*. Now, this method of notation is sanctioned by authors of standing.

In Isometrical Drawing, *if* I have failed to present the subject clearly, there is certainly nothing in the text to warrant the construction which he gives.

It is true that the chapter commences with a short explanation of Isometrical Projection, but simply for the sake of obtaining the principles of Isometrical Drawing, the relation between the two being shown. The text does not state that the two are "quite different." Neither does the use of the word "true" warrant the conclusion that a third kind of projection, different from either of these, was intended.

Since the critic has thought the errors in the plates of sufficient importance to notice, I will explain that the error in the perspective of the hexagon was made by the engraver, and overlooked in correcting the proof, but it is a thing that cannot mislead the student who follows the text.

In regard to the models which he calls poor and not well drawn, they were given as examples requiring great care in construction, and answer that purpose, though the execution of the intersections and tangencies is not the best. He says further in regard to these that only ordinary methods should be used in their construction; to which I reply that only ordinary methods are given in the chapter on regular figures, which these illustrate.

D. F. THOMPSON.

AMERICAN INSTITUTE OF ARCHITECTS.

BOSTON CHAPTER.

THE regular monthly meeting of the Boston Society of Architects took place at the Institute of Technology on Friday evening, Dec. 7. There was an unusually full attendance. The old committee on business for the meetings was re-elected.

Mr. E. R. Andrews then gave to the Society an interesting description of the process of preserving timber from dry or wet rot, by the Hayford method. This process consists in thoroughly steaming the green timber in an iron cylinder, and then establishing a vacuum in which all the natural sap is evaporated from the wood. After the wood is thus thoroughly dried, the emptied pores of the wood are filled with the hot oil of creosote by an injecting shower under a pressure of fifty or sixty pounds. All these processes take place in the same cylinder by the use of the same pump, and seem to be thoroughly efficacious. Specimens of various kinds of wood were exhibited, showing the degree of impregnation, and their soundness after exposure to unfavorable conditions for many years. Mr. Andrews also recited to the meeting the results of certain experiments to test the effect of this process upon the strength of the woods. These experiments, although acknowledged to be incomplete, seemed to leave no question that the strength of the material was notably increased.

Mr. Andrews invited the members to inspect his works and processes at South Boston.

After a prolonged discussion on this subject, a vote of thanks to Mr. Andrews was moved and passed.

The Society then heard a report from the Executive Committee, referring to various passages in the report of the Commission of the Sewage of Boston, from which it appears that in the opinion of this Commission the system which they propose will have the effect of lowering the level of the ground-water several feet. In view of the obvious danger to the piling on the Back Bay territory (much of which is cut off above grade 5, and some as high as grade 7½ or even 8) to be occasioned by this subsidence of the ground-water, the Executive Committee instructed the Secretary to communicate with Mr. Chesbrough, C.E., the chairman of the Commission, for a further expression of his views on this subject.

In reply to the communication, the following letter was received: —

CHICAGO, Dec. 4, 1877.

HENRY VAN BRUNT, ESQ., SECRETARY BOSTON SOCIETY OF ARCHITECTS.

Dear Sir, — Your letter of Nov. 22 has been received. With regard to the basis for the opinion expressed on pp. 25 and 40 of the Report of the Commission on the Sewerage of Boston (City Doc. 3, 1876), it is founded upon the belief that the system proposed would ordinarily keep the sewage constantly flowing towards the main outlet, and consequently the sewers would be free from back water at flood tides. As ordinary brick sewers, even when laid in cement throughout, do drain the soil through which they pass down to near the average level of the water in them, such a result must be expected in this case, if nothing is done to prevent it. The surface of the ground-water each way from a sewer is usually an inclined plane, more or less steep according to the character of the soil. How much the ground-water would be lowered at any point, or how much, on an average, throughout the district to be drained, it is impossible to tell: and of course equally so to say what would be the effect upon foundation piles.

On page 22 of the report of the Commission it is said, "We propose that the main and branch intercepting sewers shall be so constructed that no water will leak into them through their bottoms or side walls; for by just the quantity that may be thus allowed to leak into them, will their efficiency be diminished." Now, if this is done, dangerous lowering of the ground-water near the main and branch intercepting sewers will be prevented. The interior of existing sewers, whenever desirable, could, I am satisfied, be effectually coated with cement so as to prevent leakage through them in most cases. Our experience here with catch-basins justifies this opinion.

These and other precautions could be taken; but no doubt the City Engineer will have careful examinations made before and after the construction of the sewers, and will suggest such measures as will prevent serious damage, should any be necessary.

Very respectfully, E. S. CHESBROUGH.

A communication from Professor Agassiz was also read, enumerating in detail the various points of danger, and advising in certain contingencies the placing an injunction on the execution of the present plan, so that these points may be considered in a scientific and exhaustive manner, and such modifications may be made in the scheme as may be found to be necessary.

The Society, after a careful consideration of this subject, voted to instruct the Executive Committee to address a letter to the mayor and aldermen, calling their attention to the grave danger to be incurred by the establishment of a system of intercepting sewers as proposed by the Commission; this system, according to their report, involving such a lowering of the ground-water as would lay bare the upper part of much of the foundation-piling on the Back Bay territory, thereby in the course of a few years causing serious dilapidations, and if so, possibly heavy suits for damages against the city.

The meeting then adjourned.

BOOKS RECEIVED.

EARLY NEW ENGLAND INTERIORS. — Sketched by Arthur Little. Illustrated by 36 quarto lithographic plates. Boston: A. Williams & Co. 1878. Price, $6.00.

QUANTITIES. — A text-book for surveyors, illustrated. By Banister Fletcher, F.R.I.B.A. London: B. T. Batsford. Price, 6*s.*

THE PLUMBER, AND SANITARY HOUSES. — A practical treatise on the principles of internal plumbing work, or the best means of effectually excluding noxious gases from our houses. Illustrated. By S. Stephens Hellyer. London: B. T. Batsford. Price, 7*s.* 6*d.*

NOTES AND CLIPPINGS.

FATAL FALL OF A BUILDING. — A building in course of erection on Prince William Street, St. John, N.B., fell Dec. 6, and eight men are supposed to have been buried in the ruins.

PANIC. — It is a long time since we have had to chronicle one of the panics which the memory of the disaster at Brooklyn at one time made unpleasantly frequent. During a funeral service at Norfolk, Va., on Dec. 4, an alarm of fire was given, caused by smoke from a stove in the basement. A sudden panic and stampede followed, in which ladies and children were trampled upon. Many ladies jumped from the church windows and galleries, one breaking her back, another her leg, another three ribs, while numbers were severely bruised and otherwise injured. The church was densely filled at the time.

FIRES IN CHICAGO. — The following is the summary of incidents attending fires in Chicago during the month of November: Alarms, 30; stills, 8; total, 38. Classification of buildings: Frame, 16; brick, 9; total, 26. Occupation: Dwellings, 9; dry goods, 2; barns, 2; and one each planing-mill, shavings-shed, furniture-factory, machine-shop, paint-factory, tailor-shop, oil-works, house of ill-fame, carpenter-shop, grocery, plaster-factory. Origin traceable to procurement, 3; foul chimneys, 7; ignition of wood-work around and joists penetrating insufficient chimneys and flues, 5; rekindling, 4; maliciousness, 2; and one each wood-work embedded in furnace walls, spontaneous combustion, barrel of shavings too near fire in a stove, wood-work ignited from a stove, ignition of clothing around a stove, domestic troubles, tipping over of a lamp in a bagnio row, bonfire, insecure stove, explosion of lamp, ignition of clothing around a laundry stove; false alarms, 5: total, 38. The entire loss for the month, not including the Singer Building and contents, will not exceed $7,000; to insurance, $6,900. Insurance involved, 41,000.

STREET-CARS. — The first street railways employing endless wire rope for the propulsion of their cars are in operation in San Francisco. The cars stop and start easily, and run more rapidly than horse-cars.

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SAND FOUNDATIONS. — A block of stores is now building in Hartford, Conn., for which the foundations are laid in this way: Trenches are dug down to the hard-pan, and are then filled with water. Beach sand is then sifted in until the trenches are filled with the soaked and compacted sand, which is covered by a thick layer of concrete, which in turn is to receive the stone-work of the foundation walls.

IRRIGATION SCHEME FOR KANSAS. — It is proposed to redeem from sterility the great desert in the western part of Kansas and Nebraska, by damming the Arkansas and Platte rivers, and turning the waters into the desert, this forming a lake, from which water could be drawn for irrigating purposes.

THE PICTURE OF CATHERINE CORNARO. — The great picture of Venice doing homage to Catherine Cornaro, by Makart, which formed the most striking feature of the Austrian section in Memorial Hall a year ago, has been bought by the German Government, and will be placed over the grand staircase of the new National Gallery at Berlin. The price was 50,000 marks ($9,650).

COLUMBIA WATER-WORKS. — The *Scientific American* says that the Columbia, O., water-works, which are upon the Holly system, have now been in operation about seven years. Since they were built, the city has abandoned the use of the entire force of steam-engines, and the losses by fire have been decreased from an average, previous to the introduction of the water supply, of .65 of one per cent to .09 of one per cent upon the total tax valuation, while since 1870 the valuation of taxable property has increased, in round numbers, from $16,000,000 to $27,000,000 in 1876. The average daily amount of water now being pumped is about 1,600,000 gallons, the machinery with which the works are supplied being capable of furnishing 10,000,000 gallons daily for domestic use, or 7,000,000 gallons under fire pressure. There are now in use in the city upwards of 600 improved water-meters, from the Eagle Meter Co., of Brooklyn, L.I., which are recommended by the engineer in his report as giving better satisfaction than any meter yet tested. Since their introduction three years ago, the consumption has but slightly increased, notwithstanding the growth of the city.

BY-GONE NEW MEXICAN HOUSES. — The New York *Tribune* says: "Several models of the houses built by an extinct race in New Mexico and Arizona have been constructed under the auspices of the Hayden Survey. Some of these models were shown at Philadelphia. Mr. Jackson, the photographer of the survey, has made most of the models. The finer ones are described in detail in a recent number of *Forest and Stream*. Of the models lately made, that of the town of Taos is perhaps the most remarkable; its size is 42 by 39 inches; its scale, one inch to 20 feet. The work is first done in clay, and then is duplicated in plaster and carefully colored. The town is described as having two large houses on opposite sides of a creek that was once spanned by a bridge. The houses are 300–400 feet long and 150 wide at the base, five or six stories high, each story receding from the one below it, thus forming a terraced structure. Each story has numerous little compartments, with small windows in the outer tiers of rooms, the interior ones being dark. The only entrance is by a trap-door in the roof. Ascent was effected from story to story by ladders on the outside, which were drawn up at night. The village was surrounded by an adobe wall, enclosing ten or twelve acres, and contained four *estufas* or secret council-houses, which were circular underground apartments, accessible by means of ladders through a hole in the roof, which was fortified by a palisade. Most of these villages were perched on cliffs of great height and almost perpendicular steepness, and could be reached only by narrow roadways or staircases cut in the rock: perhaps the ascent was in part facilitated by ladders."

DEATH OF MR. SMIRKE. — Mr. Sydney Smirke, the English architect, has just died. He designed many important public buildings, was elected Associate of the Royal Academy in 1848, and had received the Gold Medal of the Royal Institute of British Architects.

A COLOSSAL STATUE OF CAPT. COOK. — The statue of Capt. Cook, which Mr. Woolner has so long been engaged upon for the government of New South Wales, will be sent to the founders in a few days; and we hear that it is not to be shown to the public in this country. The size of this statue is remarkable: it measures 13 feet 6 inches from the feet to the crown of the head, and nearly 2 feet more to the end of the uplifted arm. Thus, when placed on the pedestal already provided for its reception in Hyde Park, Sydney, the total height above the ground will be not less than 37 feet. The attitude is easy yet imposing. The great navigator has come on deck bareheaded, and has just made out the new continent showing dimly in the early morning sun. He is thus represented in the moment of a discovery which entitles Cook to rank immediately below Columbus in the list of discoverers. The drapery is most carefully worked; and the old-fashioned garb, with its laced coat, large pocketed waistcoat, tight knee-breeches, and large buckled shoes, seems to have lost its grotesqueness in the way it is here managed, and to be better suited than any other to the occasion, though the inevitable queue scarcely suits one's idea of a becoming finish to the neck. — *Pall Mall Gazette.*

STATUE OF JOHN STUART MILL. — The statue of John Stuart Mill, begun by Foley, and finished after his death by Woolner, is about to be placed on the Thames Embankment in London.

THE HÔTEL DE VILLE, PARIS. — The new Hôtel de Ville at Paris will cost, exclusive of all furnishing and decoration, 21,500,000 francs ($4,300,000).

GERMAN SUBTERRANEAN TELEGRAPH CABLES. — The total length of the German subterranean cables is now 1,477 kilometres (917¼ miles). Each cable contains seven wires.

THE COST OF ELECTRIC LIGHTING. — It appears to be difficult to arrive at the cost of using the electric light; figures of estimate in different experiments varying considerably. In many manufacturing establishments, the cost of the power to drive a magneto-electric machine would scarcely be felt, as only two or three horse-power at the most would be required. The cost of the carbons is said to be less than five cents per hour, per lamp, on the Jablochkoff plan; another estimate is about twice as much, but perhaps refers to two lamps instead of one. An electric light which does not, according to the accounts, appear to be constructed on the Jablochkoff plan, tested in practical service at La Chapelle, France, costs, including motive-power for the machine, about twelve cents per lamp, per hour. Machines capable of running three lamps cost less than $500; and perhaps that sum could be made to cover all the first outlay. The wear and tear of the machine is not estimated. A careful study of the figures thus far furnished leads to the belief that light can be furnished by electricity in France, at about two-fifths the cost of gas; and, as the price of gas in most American cities exceeds the price in Europe, it seems probable that a similar estimate of the comparative cost of electric illumination for this country would fairly apply. — *N. Y. Tribune.*

WHAT IS A VERANDA? — In Hamburg, at a recent meeting of the Society of Architects and Engineers, a committee was appointed to consider the question: "What is a veranda?"

The chairman returned answer, that after much consultation the members could come to no definite conclusion, but would beg to recommend the appointment of a second and larger committee, that after a positive decision there might be no collision with the inspector of buildings from a possible misunderstanding of the statutes! It seems that the word *veranda* (*Anglicé* verandah) is Italian, from the Latin *virens* (to be verdant), and signifies a leafy passage, — that is to say a corridor-like bower built of slats resting originally on posts; if on stone columns, the word *pergola* is perhaps more applicable.

The appointment of two committees to decide so simple a question is characteristic.

OLYMPIA. — The German expedition to Olympia sends from time to time reports of its discovery of fragments of sculpture and architectural details; but no account has yet been received which can enable us to understand the general arrangement of the group of buildings; and absolutely nothing to enlarge and correct our present imperfect knowledge of the great hexastyle temple, its proportions and exact dimensions.

The remains of a Christian church have lately been unearthed, — a basilica built on an ancient substructure during the rule of the Byzantines. It is supposed that its foundation walls were part of the Hyppodameion, the temple erected to Hippodamia, King Pelops' queen, which stood near the principal portal through which the processions passed into the Altis. Between the arcades of the small portico which is on the southern side of the basilican atrium, were discovered blocks of marble, stepped, and forming a circular stylobate, evidently the base of a group of statuary. The basilica itself, the existence of which was indeed already known to the French expedition to Morea, is built of brick and has three aisles. To the east was an apse lighted by four (!) windows, to the west a narthex of five arcades. On the western side of the atrium, before mentioned, are two chambers of uncertain use. The details of the interior lead to the supposition that the basilica was built at a very early period, an opinion that has gained strength by the discovery of two tombstones in the central aisle, which record in Byzantine inscriptions the virtues of two anagnosts (lectors) who were employed in the construction of the church. The circumstance that the apse is towards the east seems however to indicate that it was not built before the year 420, as all Christian basilicas known to have been erected previous to that date had their altar-niches to the west.

UTILIZING SUBTERRANEAN HEAT. — The Virginia City (Nev.) *Enterprise* says, "An enterprising engineer of this city is engaged in working out a plan for heating the whole town by means of the heat generated in the subterranean regions of the mines. He says there is sufficient heat in the lower levels of the mines, underneath our feet, to comfortably warm every house and every room in the city, provided it can be utilized. His plan contemplates a system of pipes, through which the heat will be distributed, while at the same time it will be drawn out of the mines as it arises. Thus he will at the same time heat the town and ventilate the mines."

AN ANECDOTE OF M. DAVIOUD. — *L'Architecte* tells this amusing piece of gossip of M. Davioud, the architect of the palace of the Trocadéro. When in 1872 M. Davioud was created a knight of the Legion of Honor, there was in his employ an excellent draughtsman, a younger man than he, who had been decorated in 1848–9, but who like a modest man never wore his decoration. On the day when M. Davioud received the ribbon the office was filled with his boisterous exultation. Imagine his surprise the next day at seeing his assistant enter the office with the coveted scrap of red ribbon peeping from his button-hole. To-day the assistant is an officer of the Legion of Honor of five or six years standing, and M. Davioud bears his chagrin as best he may.

IRIDESCENT GLASS. — A process for making glass iridescent has been patented by M. Clémandot. Beautiful effects are produced. The main feature of the process is the application of acids to the glass, under a pressure of from two to five or more atmospheres. Water containing fifteen per cent of hydrochloric acid is used to bring out rainbow tints like mother-of-pearl; and artificial gems of various sorts have thus been manufactured. The glass prepared by these processes is quite as iridescent as is that which antiquaries so much value; the pressure and the acids hastening a result that the ordinary agencies of the atmosphere would take centuries to produce.

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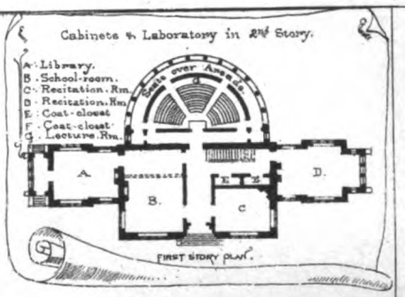
College Building Colorado Springs Peabody & Stearns Archts Boston Mass.

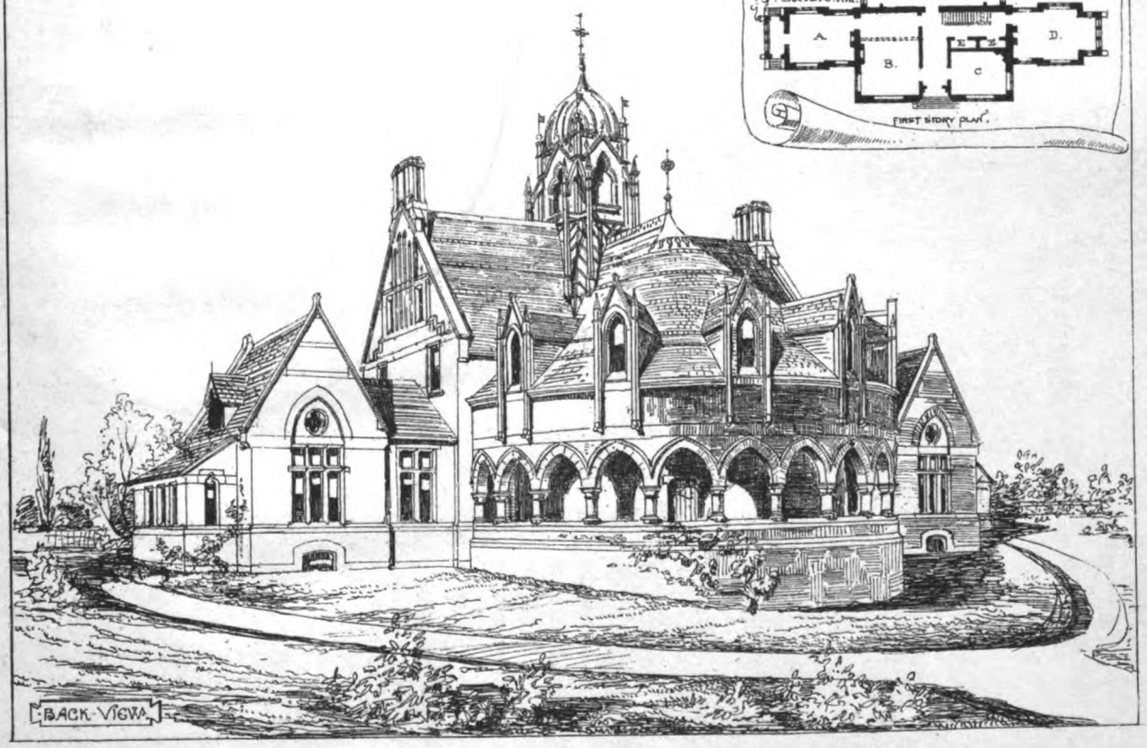
FRONT VIEW

Cabinets & Laboratory in 2nd Story.

A. Library.
B. School-room.
C. Recitation. Rm.
D. Recitation. Rm.
E. Coat-closet
F. Coat-closet
G. Lecture Rm.



FIRST STORY PLAN.



BACK VIEW

THE HELIOTYPE PRINTING CO. 220 DEVONSHIRE ST. BOSTON.

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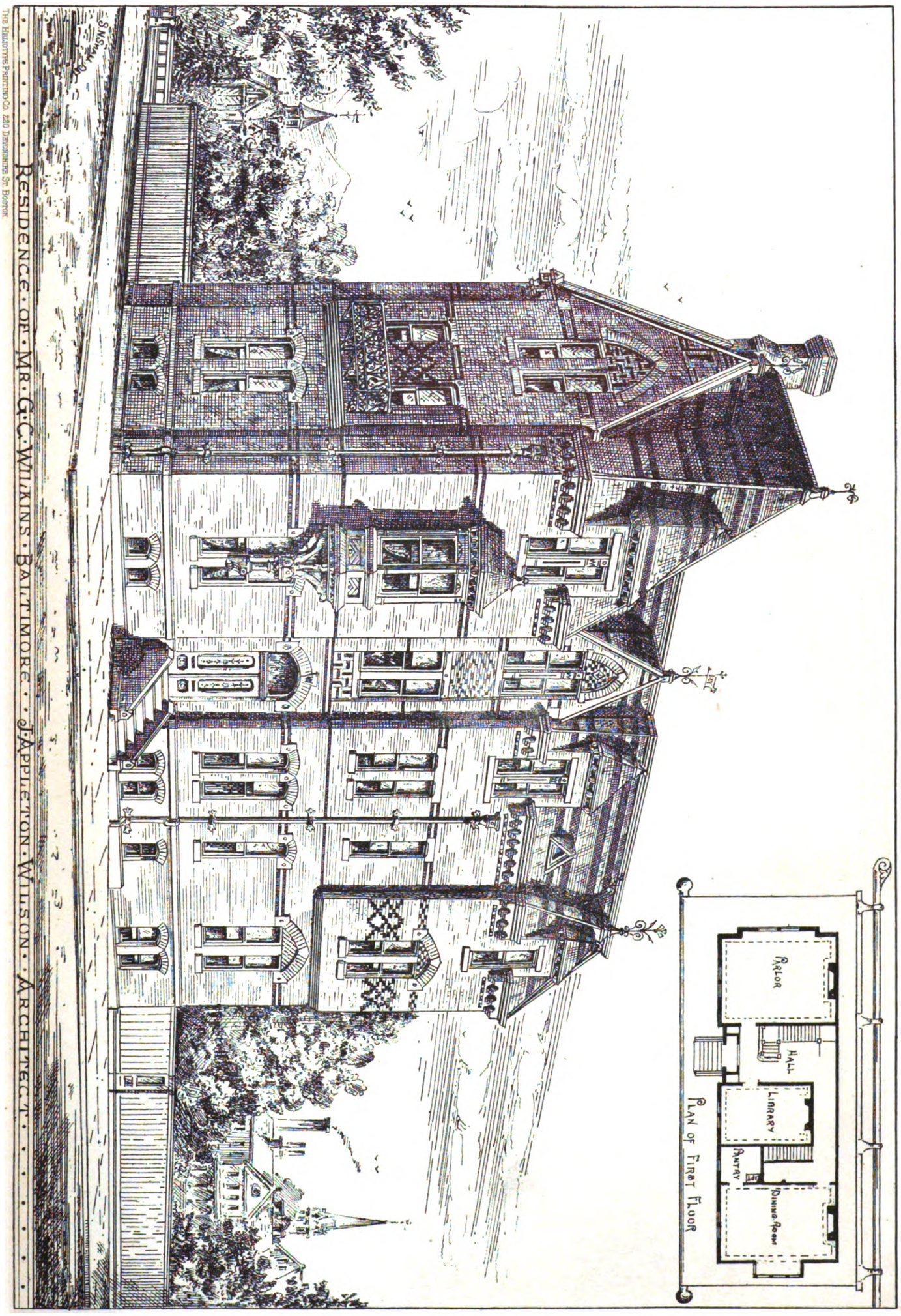

RESIDENCE OF MR. G.C. WILKINS · BALTIMORE · J. APPLETON WILSON · ARCHITECT

THE HELIOTYPE PRINTING CO. 280 DEVONSHIRE ST. BOSTON.

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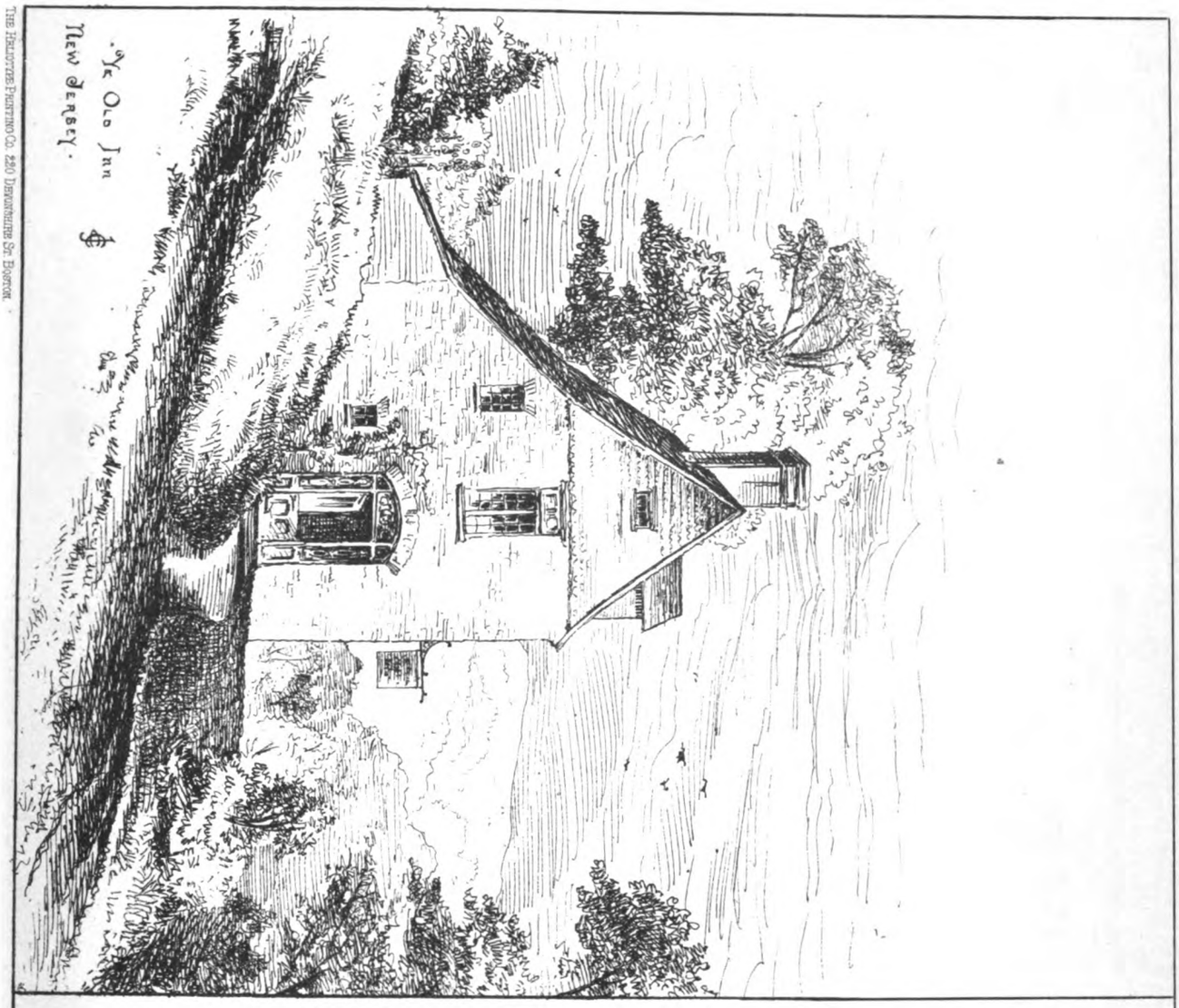

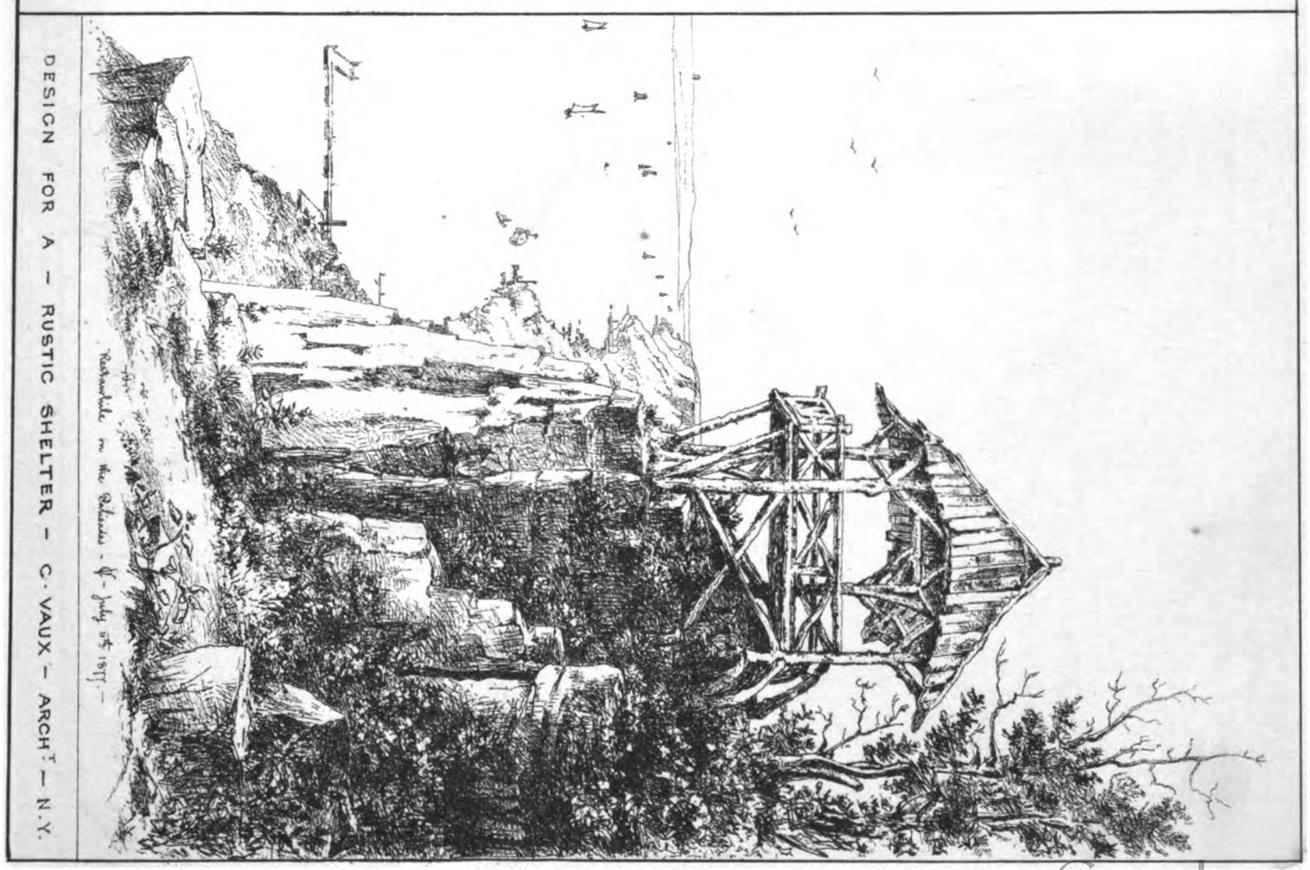

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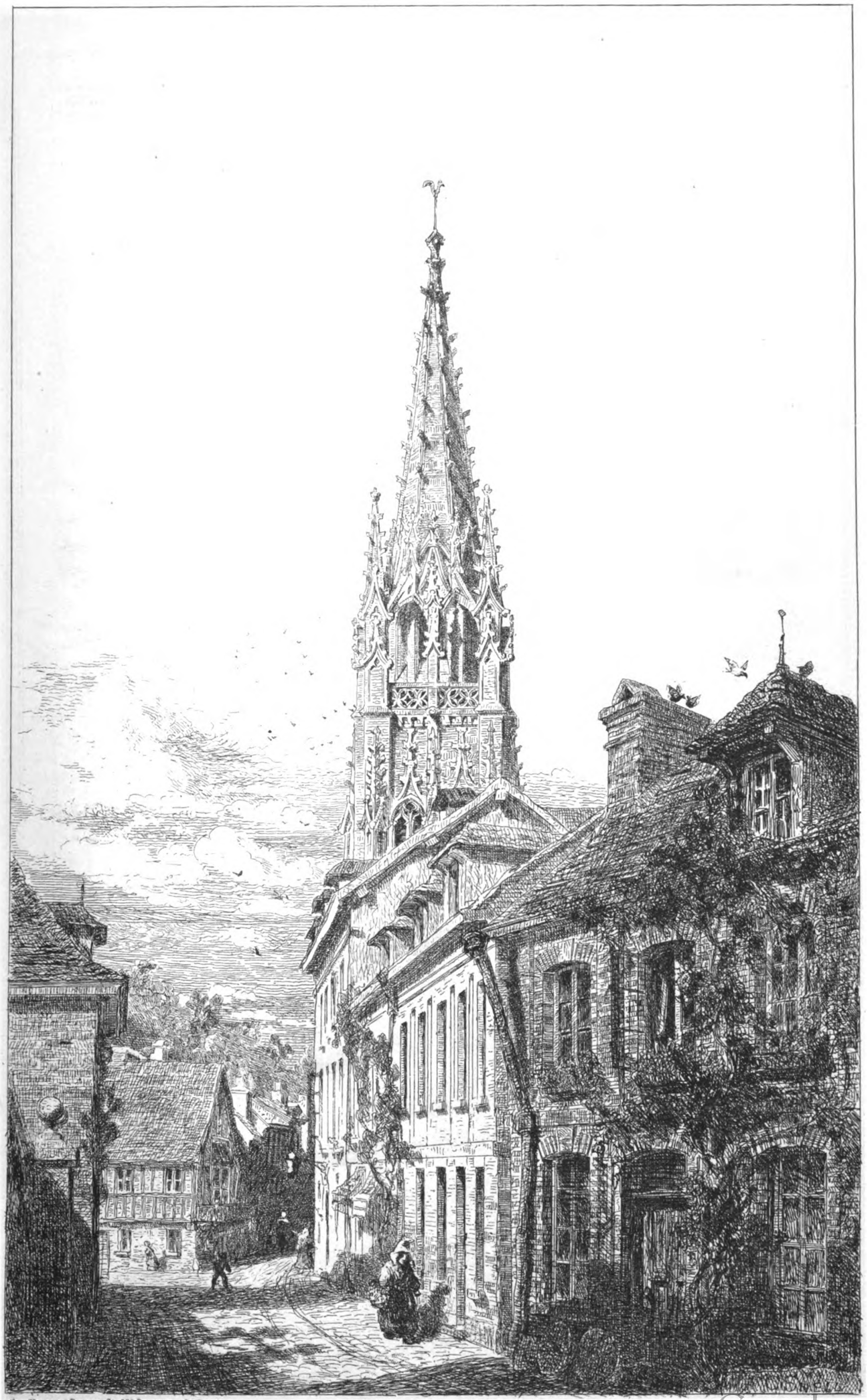

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, DECEMBER 22, 1877.

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WE are told by telegraph that the work of demolishing the famous Temple Bar has begun. Its fate may be said to have been substantially fixed from the time of the New Law Courts competition a dozen years ago. It crossed the great main street of London just where at the entrance of the old city and opposite the Temple, it changes its name from The Strand to Fleet Street. Abutting as it did at one end against the site proposed for the Law Courts, it was necessarily considered in designing them, and most, if not all, the designs included a scheme for rebuilding it in conformity with the new buildings. In Mr. Street's modified scheme which is now in execution, it was omitted, however; and for some time past the question has simply been how it should be got rid of without offence. Its middle arch spanned the roadway, and its side openings the footways; and coming just at the pinch of a rather exiguous thoroughfare, its piers were a considerable impediment to traffic. The question of removing or destroying or retaining it has been one between reverence for an old monument, and desire for present convenience; and the alternative soon narrowed itself to absolute destruction or setting up the old gateway in some respectable position on the outskirts of London where it should be in nobody's way,—Epping Forest or West Ham Park, for instance. The debate in the London Common Council reminds one of those to which we are used in our less conservative country, on the preservation of the Old South Church in Boston for instance. One Mr. Rudkin, whose name is an oddly suggestive parody on that of the most energetic foe to modern vandalism, urged that they should at once "pull down this wretched and miserable building. It was all nonsense to talk about removing the Bar in any other manner than by carting it away as rubbish." The City Lands Committee were finally instructed to remove the Bar forthwith, and take it to Epping Forest or such other place as they should select. It does not appear that this involved any order for rebuilding it, and it would not be strange if that project were quietly allowed to go by default. The Bar was built by Wren, in 1673 we believe, and makes another in the number of his famous works that have lately been improved away from the streets of London. It was not one of Sir Christopher's architectural successes however. Its fame was more historical than artistic, and is probably chiefly associated in most minds, out of London, with traitor's heads, and Dr. Johnson's walks down Fleet Street. The partial reverence which its death awakens did not attend its latter days. It had been allowed to fall into great dilapidation, and the room in one of its piers had been let out as a barber's shop. A great crack which lately appeared in one of the arches has forced the discussion on it to the present conclusion.

SINCE we wrote in our last number concerning the Washington Monument, an account has been published of what Mr. Story's advice was to the Committee on Public Buildings and Grounds. He repeated, it is said, the obvious objections to the present design as inappropriate in itself, and inappropriately carried out. He disposed of Mr. Mead's and other propositions to use the existing stump as a pedestal for a statue, by arguing that such a pedestal would require a statue so enormous and would set it so high that it could only be seen from a considerable distance, where its details would be lost, and it would merge into a mere silhouette seen against the sky. With regard to the best course to pursue he had two alternatives to suggest, according as it should be decided to retain what is already built or not. In the first case, his project was the one which has been several times suggested, by Gen. Meigs among others, of turning the shaft into a tower like an Italian campanile. He would treat it in Renaissance style, applying pilasters to the angles, bringing it out at the top into a machicolated cornice, and putting on a conical roof or spire, with a belfry stage of course, we presume. At the base he would put a great projecting porch containing an open arch, and under it a colossal statue of Washington. The other alternative, which Mr. Story apparently prefers, is to pull down the present monument, and use its materials for a new one. In this case he would recommend a canopy upon a die or pedestal, like an Italian *baldacchino*, with a colossal figure of Washington under the canopy, and a procession of statues about the base.

BOTH of these suggestions are natural and reasonable enough in their way. Their success would depend entirely on the skill with which they were carried out. The first seems abstractly the more satisfactory: the difficulty that occurs to us is that the stump is much too low to make a well-proportioned tower, while to carry it up high enough would make the taper unpleasantly conspicuous. The application of pilasters might be made to dissemble the taper, but in other respects would be by no means an improvement, we should say; and the porch at the base, besides seeming to lower the tower, would be a very questionable addition. The second form, suggested for a new monument, is the one which naturally first occurs to a student of Italian architecture, being the typical form of an Italian tomb or *ciborium*, a form much used throughout Europe in mediæval times, and often adopted in modern days, its most famous recent example being that which Mr. Story quoted, Sir Gilbert Scott's Albert Memorial. It is a form, however, of which there are so many and such splendid examples extant, that its adoption could only be justified by the most refined beauty of treatment. A commonplace or inferior rendering of it would be a conspicuous failure. Now that Mr. Story has given his opinion of what should or can be done, the question of a new treatment ought to be considered as fairly open, and it should not be closed until it has been considered in the light of all the best advice that can be obtained. There is no reason to assume that the ideas first suggested are the best that can be had. There are many architects in the country, of skill in monumental design, It is their special work, in fact, and the country will be the loser if their skill and invention are left out of the account. As for the question of utilizing the old work or destroying it, it is one that ought to be considered with reference to a variety of expedients. Hundreds of thousands of dollars' worth of work are not to be lightly thrown away; and difficult as the problem is, it should not be given up, it seems to us, till we have found out what our most capable designers can do with it.

THE labor troubles in California begin to look more and more threatening. The application of the Chinese Six Companies to the President for protection has brought out from the Attorney General the opinion, that though our treaty with China promises protection to Chinese here, in return for that which it exacts for Americans in China, the Government has no power to interfere in any State to carry the treaty into effect. The popular feeling in California being against the Chinese, the executive which fails to give them efficient protection is not likely to appeal for it to the general government; and without such an appeal there is no right to intervene till the case becomes hopeless. This brings out a new light on the subject of State rights. The questions what a treaty is worth which the Government has no power to enforce, and how a government is to protect its own citizens abroad which cannot fulfil its promises to protect foreign residents at home, are serious ones; but it is not our province to dis-

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cuss them. The leading business men of the State, it is said, while they are united in opposing the persecution of the Chinese, believe that the danger of violent disorders is very great; and it is not probable that they are over-anxious. The risk of riot and bloodshed in San Francisco and perhaps other cities, of retaliatory violence to our people in China, is very deplorable; but there is a still worse side. The use of the name of working-men to cover the communism of the worst and most violent demagogues, the tendency of working-men themselves to degenerate into mobs of ruffians, or to league themselves with such to carry out their own ends, are to us the most menacing signs of the day. California is now the crater of these tendencies, but they underlie the social surface very widely in this country and in Europe. The local manifestation of them, serious as it is, is less important than their breadth and combined strength. Working-men themselves are unaware of the danger of them; politicians are too busy to pay heed to them, except so far as they may now and then play on them to their own present profit; but they exist and work. The irrepressible Molly Maguires of Pennsylvania, the railroad riots of last summer which sprung out of the strike of perhaps the most respectable trades-union in the country, are signs clear enough for those who will heed them, one would think; yet the disgraceful verdict of the Pittsburgh jury, and the reckless speeches of some members of Congress, show how blind people are whose interest it is to have their eyes open to dangers that contain the possibility of disasters as great as any the world has seen in this century.

A QUESTION of some general interest, and of great moment to the property-holders whom it immediately concerns, has lately come up in discussing the proposed new system of sewerage in Boston. It was touched upon in the report of the meeting of the Boston Society of Architects, given in our last number. All of what is called the Back Bay District in that city is tidal land that has been filled in within a very few years. The buildings on it rest on piles. To prevent these piles from decaying, it has been considered essential to cut them off below the level at which water stands in the ground, so that they may be constantly wet. The report of the Sewerage Commissioners has said that carrying the proposed intercepting sewer across the new land would probably lower the level of the water in the ground by some feet, a result which seemed to them desirable for sanitary reasons. It has been suggested, however, that this would leave many or most of the heads of piles above the level of the ground-water, so that they would decay and let down the houses that rest on them, to the injury of the owners and the loss of the city, which would be responsible for the damage. The city engineer, on the other hand, refuses to believe in any danger from this source. The liability to harm depends on the comparative rapidity of the leakage of the ground-water into the sewer, and of its infiltration into the ground from the harbor and the surface, which last will probably diminish year by year as the ground gets more and more consolidated. In the absence of any satisfactory information as to the actual level of the ground-water, and the effect on it of the sewers that have been laid, and the flow of the tide; of the rapidity with which the water filters through the soil, and of the practicability of making tight sewers and keeping them tight, — it seems impossible to form more than a guess at the reality of the danger; but since general attention has been called to the question, it may be assumed that it will be carefully studied, and that its investigation will show reason for a safe judgment.

ONE of the perennial problems in the administration of cities, one on which perhaps more money has been spent and more experiments tried than on any other, without securing an accepted decision as to what is best, is the problem of street paving. Paris has been taken to be the best-paved city in the world; and fifteen or twenty years ago it was thought to have secured the perfection of pavement in the introduction of *asphalte*. It cost a good deal less than the best stone pavement, while for neatness, noiselessness, and comfort to those who are driven over it, it was incomparably superior. It was found in time, however, to have two objections: it wore out rather fast under heavy traffic, and the dust that accumulated on it under such use, even when frequently swept, was enough to make it slippery for horses, when slightly wet. It therefore fell more or less into disrepute for the streets and boulevards where the traffic was heaviest, and began to give way in these situations to macadamizing. This, when done with the excellent material and thoroughness of construction adopted in Paris, gave a very solid roadway, much smoother than paving, and not greatly inferior to *asphalte*. It required a good deal of attention to keep it in repair; but its first cost was very much less than either of the others. It was laid without any top-dressing, and compacted by very heavy steam rollers. The wear of the stones, however, produced a certain amount of dust, which when wet made a thin coating of yellow mud, liquid and splashy, and very adherent. Latterly there has been a tendency to return to stone paving, which, though more expensive than either of the others, requires much less care and cost in renewing. Whether it has yet invaded the principal boulevards, however, where a smooth roadway and comparative stillness are more important than elsewhere, we do not know. We are reminded of these things by finding in a late number of *La Semaine des Constructeurs*, an account of the last report to the municipal council of Paris of the Committee on Public Ways, which gives an interesting analysis of the cost of maintenance of the Paris streets, with a comparison of the expense of the three different systems. The total length of the streets is about five hundred and eighty miles; and the surface of the roadways is about thirty-five hundred acres, or eighteen per cent of the whole area of the city. Counting in the sidewalks and open squares would increase the computed proportion of free space considerably, — perhaps to a quarter of the whole area. We shall save ourselves the trouble of turning the figures given in *La Semaine des Constructeurs*, of which we shall make some quotations, into our own money and measures, only reminding our readers that a square metre is about a fifth more than a square yard; and that at the present rates of gold and exchange, a franc is equal as near as may be to twenty cents. The cost of keeping the streets in order for 1878 is estimated at 13,470,250 francs, of which 7,393,250 is for repairs of roadway, 1,090,000 for repairs of sidewalks and paved areas, and 4,987,000 for cleaning. In the last item is included 1,589,000 francs for watering, removing garbage and snow, and for disinfecting markets and urinals, which leaves 3,398,000 for the ordinary expense of sweeping. Of the whole street area, 5,820,400 square metres are stone-paved, 1,808,200 are macadamized, and only 271,450 metres remain of the *asphalte* covering.

As for the comparative cost of the different systems, the paving is most expensive to put down, and costs least to keep in order; the Macadam is much the cheapest at first, but most expensive to keep up; the *asphalte* comes between the two. Thus: the pavement costs to lay twenty-five francs the square metre, the *asphalte* seventeen, and the Macadam six. The annual expense of keeping them in order is as follows per square metre: —

	Repairs.	Cleaning.
Pavement	0.56 francs	0.42 francs.
Macadam	1.24 "	0.91 "
Asphalte	1.26 "	0.53 "

To this is to be added in each case eleven centimes per metre for watering, which makes the whole cost of maintenance, for pavement 1.09 francs per metre, for Macadam 2.26, for *asphalte* 1.90. Considering the lavish use of water in the streets of Paris throughout the year, the cost of watering, about a cent per yard, will seem surprisingly small to Americans who have been accustomed to pay twice that sum for a moderate sprinkling during the four or five warm months. To get at the comparative economy of the three systems some other things are to be taken into consideration. Thus while the ordinary repairs of a paved street are small, the stone paving in due time wears out altogether, and has to be entirely renewed, while the processes of repair in Macadam or *asphalte* have substantially maintained these coverings in their first condition. To the annual maintenance of the pavement, therefore, must be added enough to replace it when it wears out. *La Semaine* assumes the average duration of pavements in Paris to be twenty-five years, and the average cost being twenty-five francs per metre, it allows,

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on the principle of the sinking-fund, half a franc per year to provide for its ultimate renewal, and makes the following comparison, allowing interest on cost at five per cent: —

	Maintenance.	Interest.	Renewal.	Total.
Pavement	0.98	1.25	0.50	2.73
Macadam	2.15	.30		2.45
Asphalte	1.79	.85		2.64

This seems to indicate, by the way, a remarkable longevity in the Paris pavement, which may be due to the fact that a good deal of it is in streets where it comes to little wear. In fact, to make the comparison fully instructive, it would be necessary to take account of the circumstances, consider where each kind of roadway was used, and the kind of wear it underwent. The final advantage, as far as is indicated here, remains with the Macadam, and the stone pavement proves to make the most expensive roadway of the three. But in summing up the account the comfort and serviceable condition of the streets is to be considered. Pavement is uncomfortable and noisy, and the wear and tear of vehicles upon it, though this cannot be made to appear in an annual estimate, is a serious item to a community. On the other hand, frequent repairs are a considerable annoyance to the public apart from their cost. Macadam, which gives a more comfortable roadway, needs a great deal of repairing where the traffic is very heavy, and is undeniably dirty. *Asphalte* will hardly endure the hardest use, and where there is traffic enough to accumulate dust it is at times slippery. On the whole, we should infer that in French experience for streets that are used for the heaviest business, nothing has been found that will take the place of stone paving. On great thoroughfares like the boulevards, where many light carriages are used, a smooth and comparatively noiseless way is important, the cost of cleaning is a secondary matter, and there is perhaps no better covering than Macadam, if it be of the best material; while for streets of residences, where quiet and cleanliness are the first essentials, where the wear is not great, and where a little daily washing will keep them too clean to get slippery, *asphalte* is the ideal roadway. The French *asphalte*, it will be remembered, from the Val de Travers, is an entirely different material from any of the American substitutes to which the same name has been given, and which are usually compounds of coal-tar and gravel. Wood pavement, so far as we know, has not been used in Paris, and elsewhere may be regarded as still on probation, having not yet fairly established its durability, and being impugned by some sanitary authorities as unwholesome.

THE DOCTRINAIRE IN ART.

THE concurrence in late years of literary and artistic activity, and the popularizing of both, have very naturally given rise to a good deal of a kind of writing on art, of which the chief characteristic is, that while its authors are not artists their object is to instruct in art everybody else who is not. It began in serious writings by artists or persons whose chief study at least was art; but its latest developments have been a shower of books and magazine articles, written partly by literary men whose only reason for writing them was their general desire to instruct the public, quickened perhaps by a share of the common enthusiasm; and partly by artists of more or less skill, but whose skill usually lay in their art rather than in writing about it.

In this sort of writing have appeared a great many rules and formulas; some of a kind which refer directly to work in art, but most of them of a moral or *quasi*-moral kind, which have been erected into dogmas of instruction to enable people inexpert in art to judge of any thing that comes before them, or even to themselves produce works of art in a small way. The eagerness with which people nowadays have taken to ornamenting their houses has given the last impulse to this writing. It is apt to lay down the law with great decision, fortifying itself with maxims which seem at first sight to contain a sufficient gospel of art, and which, since they mostly appeal to simple principles of morals and common sense, have the straightforward sound that people like, seem clearly comprehensible, and leave the impression that here at last we have a clear, practical, and adequate guide for any sensible person in the attainment of artistic effect.

The maxims which are thus popularized are mostly of very good descent, being largely derived from the writings of Ruskin and Pugin, expounded and applied to the needs of the multitude by Eastlake and others, and now become common property for any clever magazine writer who wishes to make his profit out of the prevailing enthusiasm. On the moral side we have, for instance, the maxims that pretence and illusion in art are wrong, that honesty is the first requisite of good art, that architecture therefore should be decorated construction, that wooden structures should be of straight pieces tenoned and pinned, and not crook-sawed and glued. On the æsthetic side we are told that hand-work should be preferred to machine-work, and artistic freedom to mechanical exactness; that carpets and wall-papers should be decorated with flat and conventional ornament, not with shaded and realistic; on the common-sense side, that the architecture of buildings should be conformed to their uses, that convenience should dictate the shapes of their furniture; that pictures and curtains should be hung from rods, and carpets, withdrawn from under bookcases and sideboards, be confined to the middle of rooms. With all these and with many others of like character our readers are familiar.

Most of the ideas which have thus got currency are respectable, and many of them valuable so long as they are not relied on for more than they can do. They are of course of great convenience to many people, for in art as in arithmetic it is a great deal easier to remember rules than to understand processes or judge of results. They are useful to writers who feel obliged to take up the fashionable topic of the day, and who, being untrained in art, would be hard pushed if there were not some easy formulas of which they could possess themselves, and by which they could expound. They have been of much use to enterprising manufacturers, who, finding the public impregnated with certain ideas about furniture and decorations, have made a market out of them, or out of the names attached to them. They are especially serviceable to people of active minds and hands who, having their homes or other people's to embellish, and being infected with the popular enthusiasm for what is called decorative art, are thankful for some decisive directions which point a way to them; or even for some maxims which can tranquillize them with a sense of being set right, while they really follow their own inclination.

Nor is there any doubt that the more important of the precepts which we have thus somewhat loosely classed together have been helpful in giving seriousness to the whole artistic effort of our day. Mr. Ruskin's moral earnestness and acute insight, Pugin's reforming theories, and the more prosaic common sense of lesser writers have worked each in its way to rid art of a good deal of foolish trickery and empty pretence which encumbered it. For our present purpose we count these different influences together because all have had their share in filling popular literature with notions that are taken to be the secrets of work in art. The popular fallacy which attaches to them is that these precepts and maxims are in any sense productive of art; and wholesome as many of them are for restraints on the popular (or professional) mind, it is misleading and therefore mischievous to have them regarded as of artistic efficiency. Such rules are not art, and do not produce or teach it any more than penal statutes produce or teach virtue. They are mostly either prohibitory or mechanical, and their office in art is to keep it out of mischief. So far as they are moral suggestions they are a restraint, and so far as they are mechanical they are a convenience, more or less; but in either case no more productive of art than the laws of chemistry. We are not of those who regard morality as having nothing to do with the conduct of art, or encourage the doctrine that art may be dissociated from high aims, from sincerity, or any other moral quality that may be displayed in it. But it is just as well in these days to remind people who live by theories, that these things are as distinct from art as they are from literature. No high-mindedness nor sincerity ever enabled a painter to lay a beautiful color or bring two lines into harmony, no constructive fitness can help an architect to proportion an arch or a column, nor did common sense ever teach a decorator to give a beautiful shape to a bracket or a piece of furniture. A magazine writer or lecturer may have at his tongue's end all the current maxims about truthfulness, expression of construction, simplicity, adaptation to use, and the rest, and be incapable of judging any work of art, great or small. He may know all that is known or guessed about Greek harmonic ratios, Mr.

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Penrose's and Mr. Hay's measures of the Parthenon, M. Viollet-le-Duc's or Mr. Wyatt Papworth's proportions of Gothic buildings, and be skilled in characteristics of style, and yet show himself incapable of telling good architecture from bad; just as a man without moral sense might have the whole criminal code by heart, and not know a good action when he saw it. Things are done every day in dutiful obedience to Mr. Ruskin's precepts, that would draw inkstands full of pungent denunciation from him if he could see them; and Mr. Eastlake has the misfortune to have his name associated with more ugly furniture, we suppose, than the world ever saw before in equal time.

The truth is that the popular talk of our day about the principles of art is just as dogmatic and artistically unfruitful as the conventional talk which it has displaced. Its maxims are as doctrinaire as the old rules about balance, symmetry, breadth of light and shade, and they are artistically less operative. In our day as in every other day, the things by which the artist works are his trained artistic sense and native feeling: the only things the amateur can rely on, within the wide circle beyond which a reasonable regard for accepted teaching may prevent his straying, are such substitutes for this trained sense and feeling as nature and experience may have given him. Mr. Ruskin in his *Two Paths* has given as good an illustration of this cardinal fact as can be found. "A friend," he says, "had been maintaining that the essence of ornament consisted in three things, — contrast, series, and symmetry." Mr. Ruskin sent him a black blot on white paper, the first six digits in their order, and a grotesque figure of a man spread-eagled, such as a child might draw on a slate, saying that here were contrast, series, and symmetry, but not ornament. His friend in answer sent him "a choice sporting neckerchief," the figure repeated in a diaper on the field, the digits grouped into an orderly border, and each corner emphasized by a double blot symmetrically placed. Mr. Ruskin replied by asking, "How did you determine the number of figures you would put into the neckerchief? How did you determine the breadth of the border and relative size of the numerals? Why are there two lines outside of the border, and only one inside? Why are there no more lines? Why lines at all to separate the barbarous figures? Why did you put the double blots at the corners?" He added, what is the key to this and other questions of design, and to which he got no answer, — "It is precisely your knowing why not to do these things, and why to do just what you have done, which constituted your power of design: and like all the people I have ever known who had that power, you are entirely unconscious of the essential laws by which you work; and confuse other people by telling them that the design depends upon symmetry and series, when in fact it depends entirely on your own sense and judgment."

While we do not object then to those who demand good art in the sense of art associated with the moral virtues or with common sense, we do object to confounding the virtue or the common sense with the art. A Sunday-school book may be as good as possible, and as sensible, and yet be insufferable because its literature is of bad quality. So a homely carpet is not made pretty by shrinking to the middle of a floor, and being tacked with brass nails, or bordered; and so the shops are full of furniture as square and straight-lined as possible, compact of chamfers and tenons, and still so ugly that but for fear of hurting himself against its corners, one is tempted to kick it out of doors. The inoperativeness of the current maxims is shown in their want of result. One tires of hearing people talk masterfully about principles of art, or give the law in decoration, who show, when they lend themselves to the test, that they cannot discriminate between the rare and the ugly, the pretentious and the fine. There is no power of producing a work of art, either "high" or decorative, except in the native feeling and training of the artist, nor of judging them without a cultivated sense; and the power to lay five lines on paper in artistic shape, or the sense to recognize them when they are laid, is worth all the magazine articles on decorative art that have been written in the last five years.

THE CATHEDRAL OF BRUNSWICK. — During certain repairs at the Cathedral of Brunswick, Germany, the walls and pillars of the interior were scoured and scraped, — a process which, as is often the case, brought to light several mural paintings of merit whose existence had been long since forgotten. The wise precaution has been taken to make drawings of them before attempting their restoration.

AMERICAN ARCHITECTURE FROM A FRENCH STANDPOINT.

[The following criticism of the architecture of the United States, which we find in the *Revue Générale de l'Architecture*, may be more profitable reading for Americans than for Frenchmen. The observations are, for the most part, correct as far as they go, and the conclusions from them just, as far as they apply. It is clear that the writer had no opportunity of making a general acquaintance with the architecture of the country. Apparently he had but little knowledge of New York, and had not seen Boston or other cities farther from the Centennial. The building of Philadelphia is too much *sui generis* to serve as a type of that of the country, especially in domestic architecture. We omit the plan of a dwelling which the writer adds in a note, which is characteristic of the habits of a generation past, but not at all of the architecture of to-day. While this letter gives Frenchmen but a very incomplete picture of the condition of architecture in the United States, it shows the impression made upon a capable and apparently unprejudiced observer by so much as he has seen among us. — EDS. AMERICAN ARCHITECT.]

To the Editor of the Revue Générale de l'Architecture.

SIR, — Notwithstanding the rapid march of progress in the United States, it is to be remarked here that the development of art in general, and of architecture in particular, still leaves something to be desired. The architectural works exhibited at the Philadelphia Exhibition, of which you have done me the honor to request an account, and whose discussion will form the subject of this first letter, furnished indications in this respect, which will, I hope, interest the readers of the *Revue*.

In these notes I shall confine myself principally to the display of American architects, other nations having sent contributions of relatively little importance. England exhibits forty-one drawings, Austria some photographs, Spain a few drawings, Belgium and Italy number each a single exhibitor. Add to these a few designs by Swiss, Canadians, Japanese, and others, and the drawings of the four French exhibitors,[1] and you will have an exact idea of the architectural display.

Here, as at Vienna in 1873, the architectural works are at times lost among the industrial products, and it is thus made difficult to find them; this want of grouping in a particular spot obliges the visitor to conduct his search into buildings often far apart from each other.

The architectural display of the United States is nevertheless entirely disposed in a square hall of the annex to the Fine Arts building. It includes two hundred and sixty-eight numbers. At first sight the European architect is surprised; for except for one or two designs made according to European usages, that is to say with plan, section, and elevation, and the work evidently of Frenchmen, no plans are to be seen. The exhibition is made up essentially of perspective views, a very small number of geometrical views, water-color sketches, pen and pencil drawings, and photographic views of different monuments, among which are especially to be noted churches and state-houses, town and city halls, legislative buildings, and the like.

We meet with nothing of what might be expected of a country represented to us as having large views and bold conceptions; neither markets nor railway depots, concert-halls, dance-halls nor theatres; neither halls for public meetings, club-houses, nor bridges — of course speaking from an architectural point of view, — neither do we find any thing of what with us is so appropriately termed "projects." This last deficiency arises from a very simple cause. Taste is not yet sufficiently developed to permit the purely utilitarian side of questions to be forgotten, nor disinterested enough to lead one to make drawings for a scheme which he is not almost sure in advance of carrying out.

Most frequently the American architect is really but the employé of the contractor, or builder: the latter is every thing; he is the business man. The names of J. R. Dobbins, the contractor for the Main Building and Memorial Hall at the Philadelphia Exhibition; of Quickley, the contractor for Machinery and Agricultural Halls, — are known to all Americans; but who knows the names of the architects of these buildings? It is reasonable to say that the architect's design often bears no resemblance to the finished construction. The owner pays for the building, and imposes his own predilections, however *bizarre* they may be. What happens? Either that the artist loses all control over the work, or that his services are dispensed with. Streets, or rather blocks, are to be seen, consisting of houses built according to a special type adopted by the builders, and all absolutely alike, although belonging to different proprietors.

Houses are sold ready-made. The Iron Works Co. delivers façades of cast iron in accordance with the patterns in its prospectuses. The hand of the architect is not to be seen in these questions, and it is superfluous to say that taste is sacrificed. These houses are retailed in horizontal slices. The owner who, in consequence of the increase of his family, feels it necessary at any given time to enlarge his dwelling, buys a slice, that is to say an additional story, puts it on his house, and replaces the roof above; nothing can be more simple. But fancy looking for a harmonious whole in a house repeatedly enlarged in this fashion!

This process has even been applied to a public building, the New York Post Office, one of the most important in that city, which has been augmented by an additional story above the three

[1] MM. Crépinet, Devrez, de Lalande, and Picq; the first of whom received a medal.

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which originally constituted the structure, and this building is of white marble. In this country, however, necessity knows no laws.

Here, certainly, is much criticism and many reservations; but at the same time it must be admitted that if the artistic faculties of the American people have been hitherto but slowly developed, this has arisen through the absence of any serious special culture. An artist cannot be made in a day; still less where a whole people is in question, can they be raised in a few years to an equality with the oldest countries of the Old World, where art has taken centuries to reach its present development. It is certainly a matter for surprise to remark the progress of young Americans when placed under skilful direction.

The only artistic institution of serious pretensions as yet existing in the United States is established at Boston, in the State of Massachusetts. There, under the direction of Mr. Walter Smith, an English artist from the South Kensington Museum, instruction in drawing has been organized in a complete and thorough manner, with excellent results that were much remarked at the Philadelphia Exhibition. But in the other States and in Philadelphia especially, nothing similar exists. Still in Philadelphia itself an academy of fine arts has just been finished, situated in the centre of the city, and containing a good collection of pictures and of plaster casts from the antique; this collection is, however, deficient in casts from architectural examples. At the Exhibition none of the results of this institution were as yet to be seen. Efforts are now being made to establish at Philadelphia a gallery intended to be for America what the Kensington Museum is for England, and the museums of Moscow and Vienna for Russia and Austria. Under the name of the Pennsylvania Art Museum, a collection, accruing partly from gifts, partly from works of art bought in the different sections of the Exhibition, has been placed in the rooms of the Art Gallery or Memorial Hall of the Universal Exhibition. But this situation, in our opinion, is too far from the city; and it is to be feared, moreover, that such a collection of works of art may, for a long time yet, be a dead letter to the public, unless artistic instruction receives in the future a more vigorous impulse than it feels at present. Glance at the programme of studies in the large universities of this country, and you will see that instruction in drawing is sacrificed to a lamentable degree. Often it receives no consideration whatever. There is much then to be done before attaining to the establishment of a great special school of architecture. And yet, if we except a few artists of merit, such as Hunt, Fernbach, Post, Thayer, etc., who have evidently studied in Europe, or attentively examined our cities and collections, we feel in the presence of the greater number of American monuments the imperative need of this school, without which nothing good or rational can be accomplished. One runs the risk, moreover, of following a wrong road; for unhappy tendencies, pursued under the pretext of independence, — as if art and architecture had not their laws, — already assert themselves, against which it is full time to vigorously contend by a higher and more earnest instruction, and which an inspection of the exhibited works will make evident.

The absence of plans which I mentioned above renders it very difficult to pass judgment upon the designs: the almost absolute impossibility of analyzing the interior distribution of the buildings will perforce make the few descriptions that I shall try to give monotonous. We will follow, if you like, the same order as the catalogue, which is almost that in which the drawings were placed on the walls.

No. 505. By Messrs. Cummings and Sears of Boston. We find under the title of the Old South Church, a pleasing pen-and-ink drawing: the building is of brick and stone, of no particular style. The principal mass is flanked by little porticos and porches, indispensable accessories of the churches of this country, as well as the square tower that rises in one of the angles. This description is applicable to a number of other designs for churches which figured at the Exhibition, and of which we shall at present content ourselves by naming the principal, those of Messrs. Henry Dudley, H. M. Congdon, C. C. Haight, W. T. Hallet, Hartwell, etc.

Under No. 510, we find by Messrs. Bryant and Rogers of Boston, a huge building for a life-insurance company. Four turrets or pavilions form the corner features; the main body is in five stories, above which a cornice of considerable projection supports a roof surrounded by a balustrade, which may be of stone, of cast iron, of or zinc, — it is hard to say which. It is, in fact, impossible in America to tell any thing of the construction of a building from its simple inspection; for builders seem to take pleasure in perverting the nature of the materials used, and paint wood and zinc in imitation of stone and marble indifferently, — a bad practice, and the cause of gross errors and faults of taste.[1]

No. 511. Mr. John McArthur. The New Philadelphia Public Building. This drawing, as regards size, is the most important at the Exhibition, and its author received a medal. The building is in process of construction, and will not be entirely finished for eleven years. It is to be built of marble, granite, and other costly materials, and will cost incredible sums, twelve million dollars, it seems. It covers a vast extent of surface, — 155,921 feet for the structure itself, and 46,219 feet for the different courts, — and is built upon ground left to the city by a Frenchman, Stephen Girard, a millionnaire who died about forty years ago. It is placed at the intersection of the two principal thoroughfares of the city, Market Street and Broad Street. The architecture is made up of motives from the new Louvre, arranged in American fashion. So far as completed, the sculpture is mediocre, setting aside a few ornamental motives taken from the old Liénard, who is still very much the mode here. In the middle of this enormous mass of marble, a four-storied tower is to stand, ornamented with a monster clock and crowned by an octagonal cupola, with the statue of Penn at the summit. The total height of the tower from the ground to the top of the statue is 510 feet. Cover the different parts with high roofs, with mansards and bull's-eyes, and you will have an idea of this eighth wonder of the world. It really seems here, that the more a building costs, the finer it is considered. The plan is not shown. It would nevertheless be very interesting to study it; for in the part that I visited, — it is built up to the first story, — I noticed halls, or rather important vestibules, which it will be necessary to keep constantly lighted by gas. The same defect is met, by the way, in the Capitol at Washington.

No. 514. Mr. Thayer. The New York Life Insurance Company's building. A pleasing water-color drawing of a monument, the production of a school that M. Pascal, in his letters upon the Vienna Exposition published by the *Revue*, characterized as the school "smothered in detail, losing all notion of proportions, and of just relations, striving for effect in size. . . ." This is a translation of the style known in England by the name of Elizabethan, or Jacobean style, the style that succeeded the Tudor, and which is a mixture of Renaissance and English Gothic. With very rare exceptions, nothing remarkable, it seems to me, has emanated from this imitation of English architecture, and buildings composed in this style are always heavy and over-weighted.

Messrs. Sturgis and Brigham of Boston exhibit under Nos., 531–533, a court-house, an immense structure for Chicago, and two rather original designs for churches. These gentlemen received a medal.

By Mr. Putnam of Boston, we find under No. 537, a very careful drawing of a private house at Boston; a type of the houses for the wealthier classes, and English in feeling. The principal story rests on a basement, and is reached by a flight of ten steps. Above this are two other stories, and a mansard roof. The whole is very simply arranged.

Nos. 538 and 539. Messrs. Ware and Van Brunt of Boston exhibit some private houses, designed simply and with disciplined taste. They show us in addition (540 to 542) views of the Memorial Hall at Harvard College. Its appearance is that of a church: buttresses between Gothic windows give the monument a falsely religious air; a huge tower suggests the great bells that are to be hung there: a mistake; it is simply a dining-hall and theatre for the college. These gentlemen received a medal.

Mr. Cady exhibits (552) a competitive design for the Tribune Building in New York. This mass of stone and brick has no less than eight stories, and the tower that flanks it has at least ten. This design was not adopted. It is very much like another design for the same building, exhibited by Mr. Hunt, of which we shall speak farther on.

THE ILLUSTRATIONS.

THE CATHEDRAL OF NOTRE DAME, PARIS.

THIS view of Notre Dame which is taken from the south-east, from the opposite bank of the Seine, is reproduced from the brilliant etching of M. Delauney, published by Goupil, Paris. The group of buildings at the left of the plate is the famous Hôtel Dieu, which, after serving over twelve hundred years as an hospital, — it dates from the time of Clovis II., though of course the buildings have been frequently renewed, — has just been removed so as to improve the Parvis Notre Dame, as the place in front of the cathedral is called. Between the Hôtel Dieu and the cathedral is seen the spire of the Sainte Chapelle, built in 1245–8. The history of the cathedral, which was founded in 1163, is so easily accessible to all, that it is not worth while to attempt to epitomize it. The building is now in excellent repair, and is under the charge of M. Emile Vaudremer, the one of the official architects who has the care of all the ecclesiastical monuments of the city. It may not be generally known, that during the Commune, the cathedral, which was in the possession of the Communists, who used it as a storehouse for forage, petroleum, and as a stable for their beasts, narrowly escaped destruction. It was their intention to destroy the building if they found that the Versailles troops were sure of getting possession of the city, and powder was stored in the cellars for this purpose; but fortunately, before they found that their last moment had come, it was used in defending the barricades. A more romantic story is told of the cathedral's escape. A dying Communist told the soldier who was assisting him to reach a shelter, that the hour was just come when the slow-match

[1] To cite a single example, the editor of the *Revue* has seen at New York and elsewhere, cast-iron gates painted and covered with a sand made up of pounded freestone, to make them look like gates cut in freestone. In appearance they were freestone, but their form was what the cast-iron logically demanded, and which was energetically opposed to the nature of freestone. Very handsome cornices of pine, painted in imitation of marble, sometimes cover walls of the genuine stone; but we ourselves in France, in our winter resorts, where improvisation plays such an important *rôle*, have adopted this American process. It is thus that speculation encroaches on art with us also. — *Editorial note.*

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which should fire the magazine under the cathedral was to be lighted. The soldier hurried to the cathedral, and reached the cellars just in time to stamp out the lighted match. Although unsuccessful in utterly destroying the cathedral, the Communists did to it what in other countries would have been almost irreparable mischief; but the French made it a matter of national pride to efface all marks of the war, so as to show the Germans that though subdued, they were not crushed. All the old stained glass of the cathedral was destroyed by a fire which we believe was accidentally lighted, so that the aisle and clere-story windows are now filled with plain cathedral glass bearing only a simple geometrical design; but the choir windows have been filled with modern stained glass, whose mellow richness of tone and excellence of design leave less room for regret that the old glass has been destroyed.

SKETCHES FROM A SCRAP-BOOK. BY MR. L. S. IPSEN, ARCHITECT.

A FIRE-INSURANCE COMPANY'S BUILDING. MR. BRUCE PRICE, ARCHITECT.

This is a view of a fire-insurance company's building for one of our leading commercial cities. The designs for the work were submitted in January, 1875, and shortly afterward adopted by the company. The necessity, however, of having an increased capital stock to meet the requirements of a rapidly increasing business, rather than new quarters, led them to defer for a year or two the charms of building. It was then intended that the structure should be three stories and a basement high, — the design submitted for that front being similar to the one here shown, terminating over the level of the present fourth floor in a high machicolated cornice and parapet. The present design raises the building two stories higher; the estimates for carrying it out being no greater than the original outlay contemplated in erecting the three-story building. The front is to be of Baltimore pressed brick with black joints, with archivolts of beaded and dog-tooth moulded arch brick. The basement will be of granite; the sills, bands, frontispiece, and relief work of Ohio free-stone; and the shafts of the columns of polished Scotch granite. The spandrels over the first tier of windows are to be filled in with some ornamental tile-work, treating conventionally the spirit of fire-insurance as an ever-wakeful genius who watches over the marts and homes of the city, and holds out protection against the devastations of fire. The great dormer window of the fifth story lights a studio, the belfry of the tower forming an open loggia as accessory to it. The tower and front roofs are to be covered with red earthen-ware tiles. The window transoms filled with bull's-eye of colored glass, and plate glass for the lower sash. This lower sash is to lift its full length from sill to transom up into a hood in the frame-like jib sash frames. The interior is to be fire-proof, and finished with hard wood. It is proposed to commence the work with the opening of spring.

HOUSE AT MILTON, MASS. REMODELLED BY MR. W. RALPH EMERSON, ARCHITECT.

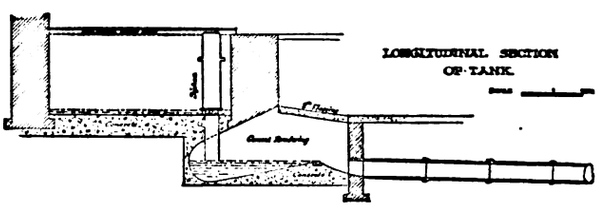
FLUSHING TANK AND SYPHON.

MR. ROGERS FIELD, a leading sanitary engineer of England, invented some years ago, a peculiar form of syphon for use in the sewage tank or meter, which was the subject of a joint patent granted to himself and Mr. J. Bailey Denton. This tank has served its useful purpose for some time past, notably at Merthyr Tydvil in Wales, and more lately at Lenox, Mass. It is a device by which the sewage matter is accumulated at the outlet until the tank, however large, becomes quite filled, and is then rapidly discharged in sufficient volume to distribute itself uniformly over agricultural land prepared to be irrigated by it, or through the system of absorption drains arranged for its disposal. It is an assured and complete success.

Subsequently Mr. Field adapted his invention to the use of private houses, — accumulating the flow of the kitchen sink, for example, to the amount of thirty or forty gallons, and then discharging it with a rush through the drain.

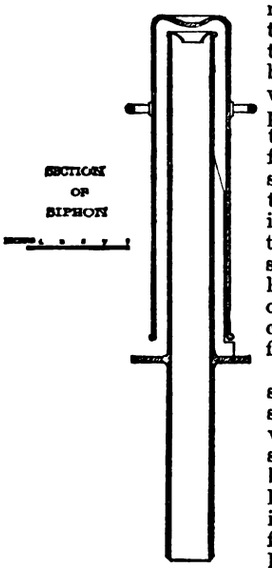
The tank and the syphon which are here shown are later applications of the same principle to the accumulation of liquid from whatever source, to be used for the flushing of public sewers. For example, five or six houses on each side of the street at the very head of each sewer, instead of discharging their wastes directly into it, discharge them into a tank whence they have no outlet, until after filling it entirely they bring into operation a syphon through which the flow is regular and rapid until the whole tank is emptied. In this manner, while the sewage of these few houses is perfectly removed from them, it becomes a source for the automatic flushing of the whole line of sewer, from the head to the outlet. Where this flushing is done by means of sewage, some provision must of course be made for ventilating the tank in such a way that its fumes can neither do harm nor cause annoyance. Where a sufficient water-supply is unavailable for use during protracted droughts, the flushing tank may be filled from the street wash during a great part of the year, and the houses may, in this case, drain directly into the sewer.

Indeed, as this device gives the utmost flushing efficiency to a given quantity of water, periodic flushing at short intervals would not constitute a very serious tax on any tolerably copious water-supply. Even in towns where there is no public water-supply the ease and safety with which this device will enable us to use the sewage itself for keeping the sewers clean makes the introduction of a regular system of sewerage easy and trustworthy. Wher-



ROGERS FIELD'S PATENT FLUSHING TANK AND SIPHON.

ever the soil is springy, it will be an easy matter to secure enough soil-drainage water, by the use of cheap agricultural tiles, to afford copious flushing. One fortunate feature of the arrangement is that very little elevation is required. The tank may be long or short, broad or narrow, deep or shallow, round or square, as circumstances may require. It may be a rectangular chamber of masonry, or a vitrified pipe chamber eighteen or twenty inches in diameter, of such length as the desired capacity may require. The syphon may be made of such size as to suit any depth of water; and when once brought into operation it will discharge rapidly all water so situated as to flow to it, whether the depth be one foot or ten feet — the velocity of the first flow being in proportion to the head. A very practical method of applying the principle would be to place a small tank of mason-work a few hundred feet below the head of a proposed sewer, and to make the sewer above this point of very large pipe, having its inlets at the top and a six-inch ventilator rising from its upper end to some suitably elevated point. This large sewer would act as an extension-chamber of the tank, and its whole contents would be utilized for each flushing.



The construction of the tank, as shown by the illustration, is extremely simple. Its outlet is directly downward through the longer limb of the syphon, which descends through the bottom of the tank. The top of this limb is placed at the high water line; it is furnished at this point with a funnel-shaped copper adjutage which leads the flow away from the sides of the pipe and causes it to fall in a spray involving and carrying down the contained air. The shorter limb is a larger pipe, closed at the top and inverted over the inner and smaller one. An important feature of the invention is the sealing of the lower end of the pipe to prevent the replacing of its air from below. By reference to the illustration it will be seen that in the lower chamber a dam is raised to a height that will cause the mouth of the pipe to be closed with water. A small notch in the top of this dam lowers the water so as to admit air to the pipe.

The operation is as follows: The upper chamber being emptied, and the lower one having its water level a little below the end of the pipe, water or sewage accumulates in the upper chamber until it reaches the top of the inner pipe; it then begins to overflow. As soon as the flow is greater than the capacity of the notch in the dam, the water in the lower chamber rises and seals the lower end of the syphon. The air is soon driven out of this by the falling spray, and the syphon is brought into full action, which continues until the tank is emptied. As soon as the flow into the upper tank becomes less than the discharging capacity of the notch in the dam, the water in the lower chamber falls and admits air to stop the action of the syphon, which can have no new discharge until the upper chamber is again filled. There are certain details of construction varying according to circumstances, which it is not worth while to explain here. Our purpose has been only to set forth the leading principle of this most useful adjunct of modern sanitary engineering. G. E. W.

LIGHTING BY ELECTRICITY. — It is understood that during the Paris International Exhibition tests will be made of the various methods of lighting streets and buildings with electricity, and the relative value of the different systems will be determined. Measures are to be taken to insure the utmost impartiality in the experiments.

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CORRESPONDENCE.

A WASHINGTON-VANDERBILT MONUMENT. — NEW WORK. — PAPER READ BEFORE THE SOCIETY OF MUNICIPAL REFORM.

NEW YORK.

NEW-YORKERS may well look back and tremble at the danger which at one time hung over them. It was a narrow escape, a very narrow one indeed, which prevented our metropolis, already overburdened with the oddities and vagaries of architecture, from having one to overtop them all in a Washington-Vanderbilt monument. Mr. Arthur Gilman has come forward under the guidance of lawyers feed to ferret out all the foolish projects and notions of the late Commodore Vanderbilt, and states to the court that at one time the old railroad king proposed erecting a monument higher than any thing yet built by the hand of man. The testimony of Mr. Gilman is interesting, and carries us back to 1867, when, as Mr. Gilman says, he —

"Had an interview with Commodore Vanderbilt, Horace Clark (his son-in-law) introducing me. He said he had been expecting me, and produced two or three sketches which I had made at the request of Mr. Clark; he produced a letter which he had received from Mr. Bancroft. It appeared that Mr. Bancroft had been requested to act as one of the trustees of a monument which the Commodore had in contemplation to erect in Central Park to the memory of Washington; he seemed to want to have it very dignified and striking, and asked me if either one of these sketches was capable of being carried to the highest structure ever erected by the hand of man. He had a little paper on which he had noted down the heights of various buildings in the world. I conversed with him about the Pyramid of Cheops, and I gathered from the whole conversation that his desire was to have this monument the highest structure in the world. I recollect his asking me about the height of the tower of Cologne Cathedral; I said about five hundred feet. 'Well,' he said, 'that ain't completed yet, and if we make this six hundred feet you are quite sure it would be the highest monument ever built by the hand of man?' His idea appeared to be that the striking thing would be to have the highest structure in the world. The conversation resulted in his desiring to have one of the sketches enlarged and put in color, which I did; but have not been paid to this day. If the monument were placed in the situation which I suggested, Mount Morris Square, where there would be a stone foundation, it would cost $750,000; but I did not understand that the cost entered into the consideration at that time — only the height of the monument was in question. There was no architectural difficulty in the erection of such a monument; it was entirely a possible thing to do."

As the object in calling the witness was to prove the Commodore of unsound mind, the question was put on the cross-examination as follows: *Q.* You have stated the conversation and the circumstances, and the plan which seemed to be in his mind: did it impress you that there was any thing irrational in that plan? *A.* No, sir; I don't know that I could say it was irrational, and I was bound to think his selection of an architect eminently judicious. (Laughter.)

Subsequently under the re-direct examination Mr. Gilman acknowledged that the plan of having such a pile was at least "eccentric."

It will be argued that the mind which could see in mere height any particular merit must have been at least rather unbalanced. It has been jocularly proposed that this six hundred feet of base would form a fitting foundation for the obelisk which the present head of the Vanderbilt family promises to import for the benefit of the citizens of this city.

Gambrill and Richardson have in hand a large apartment house, which it is proposed to build upon a very prominent corner of Broadway. Mr. Schickel is one of the busy young architects, having just made drawings for St. Stephen's Church at Groghan, N.Y., and for a convent at Amityville, L.I., while his "Bella" apartment house here and the Romanesque church in Boston are progressing.

Bloor and Oakey have a long list of contracts in hand. A stone house at Orange, N.J., promises to be unique; while in a Sunday-school building at Kingston, N.J., Mr. Bloor is building a double-faced brick wall, showing colored brick within and without. At Buffalo, where Mr. Oakey is busy completing a large residence for Senator Sprague, he has other work, including a residence for Bishop Coxe, under way, amounting in value to nearly $200,000.

A few evenings ago, Mr. Bloor read a long paper before the Society of Municipal Reform, on "the duty of architects as to economy and appropriateness in their designs, especially for public edifices, and as to the responsibility for the cost so generally being immeasurably beyond the estimates." Such was the text suggested to Mr. Bloor when invited to prepare and read the paper; and to it he joined "the reciprocal duties of owners and building committees." Mr. Bloor treated the subject at length, pointing out why, under the glare of newspaper notoriety, the details of all operations connected with public buildings should be distorted. The erection of a public building is looked on by corrupt office-holders and men in power as an opportunity to gratify their personal greed; but no public investigation has yet fastened charges of corruption on any architect of public buildings. The dishonesty, where it exists, is in departments entirely beyond the control of the professional man engaged. The difference in apparent rates in public as compared with private work is easily traced in each instance, and arises in many cases from the long time elapsing between the tender and the beginning of work. Where there is an uncertainty as to the market, the builder or contractor must protect himself by a liberal margin. Charges might be equitably made against architects on public work where peculation has been practised, that their commissions and fees are computed on the bills fraudulently drawn; but where the fraud cannot be traced, it would be manifestly suicidal in an architect to raise a hue and cry while unprovided with legal proofs of erroneous charges. On the matter of appropriateness in design, the paper left it an open question, doubtful whether any real conclusion could be reached which would be acknowledged by all as just and proper. Some insisted that a building should indicate its uses in its build and design: others regarded this as immaterial, and maintained that it would be fully as logical to insist that a merchant, a manufacturer, or a man of any other avocation, should be distinguishable by his dress, as that the uses of a building should be detected in its outward parts. General consent had fixed Gothic forms for ecclesiastical uses, and the Renaissance for other uses; but no fixed axiomatic rule could be laid down, nor could the general public be given any guiding principles in judging the works of architects as to appropriateness of design. Mr. Bloor with unsparing pen exposed the unjust treatment so often dealt out by building committees, and traced the root of all the trouble to personal greed and self-aggrandizement. A vote of thanks at the close, was given the speaker; but in the discussion following, there were some who insisted that it properly fell upon the architect to secure honesty in administration, as well as economy and appropriateness in the design and its carrying out. W.

BUILDING ACCIDENTS. — NEW BUILDINGS. — TRINITY CHURCH.

ST. JOHN, N.B., December, 1877.

THE work of rebuilding the city has progressed perhaps too rapidly for the welfare of the buildings, as has lately been shown by the falling of several of them. The weather has been unusually fine for this season of the year; and consequently the work has been continued quite late.

It has been a custom here, since the fire, for two owners of adjoining lots, where they couldn't agree, to build each his own party-wall; i.e., instead of building a 16″ or 20″ bonded wall, they build two 8″ or 12″ walls side by side. This was the case of a four-story building in King Street, which fell about two weeks ago. The building was between 40′ and 50′ wide, with a girder in the centre, insufficiently supported by 3″ x 4″ studs. These studs buckled and let in the 8″ party-wall. The wall on the other side was a bonded wall, and stood uninjured. The latest disaster of this nature occurred Thursday, Dec. 6, at four P.M., when two stores in Prince William Street, belonging to the Walker estate, fell. These stores had been well built, and according to the law; the rear and party walls were up to the roof, which had not been put on; the front wall was up to the second-story lintels; each store measured 26′ in span, with a 16″ wall between. The party-wall on one side was hollow (8″, 4″, and 8″), and had been built by the owners of that building, J. and A. McMillen. It was insecurely bonded, — not having withes every three feet, according to law, but a header run through here and there. A large portion of this wall was torn out, and it is thought that this was the cause of the fall of the Walker building. The other party-wall of the Walker building was a solid brick wall, 20″ thick. There are various other theories about the fall. The first-story floor was covered with a quantity of sand, 4′ thick, 15′ wide, and 42′ long. This had become thoroughly saturated by a twenty-four hours' rain, and was not only a great weight on the floor-timbers, but exerted a pressure against the central wall, which some think was the first to fall. The rain-storm had been very severe; and the roof not being on, the rain came down on the upper floor, which was crowned 1½″, and ran right off into the wall, thus drenching it entirely, and of course weakening it very much. But all this matter will be cleared up in the investigation which is now going forward. The fall of this building was not owing to a fault in the construction, as was the case in the building on King Street, of which West and Anderson of New York were the architects, and Mr. Green of the same place the mason. The architects of the McMillen building, which will have to come down, are Croff and Camp of Saratoga, N.Y. The Messrs. Spear of New York were the builders of the Walker building.

The new buildings in town are of brick, most of them, having stone or galvanized-iron finish. In some sections a number of frame-houses are being built; but these are, as a general thing, cheap houses. The new Police-Court, Ferry-House, Market-Square block, and several others by W. G. Preston of Boston, are among the best. Messrs. Smith and Dunn are connected with Mr. Preston on these buildings, and have themselves done some forty or fifty buildings of merit. Enamelled bricks of various colors, and galvanized iron, are freely used. There are two buildings — one on Dock Street, by Stead, and another on King Street, by Dumaresque and Dewar of Halifax — in which white enamelled bricks are freely used, making them look like frosted cake. A house on Orange Street, by McKean and Fairweather, is quite good: they have also built some fine-looking stores. Mr. Henry P. Clark of Boston has a block of houses on Orange Street, which is among the best, if not the best in the city. It is built entirely of brick, and is excellent in detail. One of the best brick stores is that by Mr.

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J. C. Babcock of New York on Prince William Street. Smith and Dunn, of this city, are building a house on Charlotte Street, which shows study. The Trinity Church competition has been awarded to Messrs. Potter and Robertson of New York. Mr. Babcock of the same place will have charge of the work. The competition was between Mr. F. C. Withers and Messrs. Potter and Robertson. The plans were for a church to seat one thousand persons on the floor, — no galleries, — and a school-building to seat six hundred, together with committee-rooms, vestry-rooms, etc. The accepted design has a tower and spire two hundred feet high, with an illuminated cross at the top. This cross will be similar to those on one of the Trinity chapels in New York, and on the Roman Catholic cathedral. It is perforated with a number of holes, and will be lighted by gas. The church being situated on a high hill, it will be seen at night for miles at sea. The other new churches are of brick, and are rather poor in the way of design.

There is but one building inspector here for the whole city; and he has as much as he can do, and gets all the blame if any thing goes wrong.

WARRINGTON.

NOTES AND CLIPPINGS.

CASTS OF THE BRONZE DOORS IN THE CAPITOL AT WASHINGTON. — Plaster casts of Crawford's bronze doors at the Capitol at Washington have been presented to Amherst College by the Ames Company of Chicopee, who cast the originals. The gift was made on condition that some friend of the institution would pay for putting them in order and setting them up in the art gallery. This expense, amounting to nearly $700, will be borne by Mr. J. H. Southworth of Springfield. They are to stand at the west end of the hall facing the casts of the Ghiberti doors, which are at the east end. These cast are the only ones that were ever made, and no others can now be obtained as the moulds are destroyed.

THE WASHINGTON MONUMENT. — The original design of the Washington Monument was never looked upon with much favor by persons qualified by culture to pronounce judgment as to its merits. Those who have been aware of this fact were not surprised to hear that Mr. Story, when consulted by the Committee on Public Buildings, advised them to abandon the idea of completing it as originally designed. He thought the plan might be modified so as to make the work an ornament to the city. He deserves special thanks for having emphatically condemned the proposition to use the present structure as a base for a statue of Washington as proposed by Mead. We believe the nation has now escaped the peril of having that structure made a huge specimen of American bad taste. — *National Union, Washington.*

A MUSICAL MOUNTAIN. — The Virginia (Nev.) *Enterprise* says, "A gentleman of this city, who has been taking a look among the old abandoned mines of Truckee district, made a critical examination of the musical mountain, of which a good deal was heard some years ago when the mines were first discovered. Some of the early miners pitched their tents at the foot of the mountain, and were not a little surprised and puzzled at hearing, during the quiet hours of the night, tinkling sounds that seemed to pervade the whole atmosphere, coming from they could not tell where. The sounds were not unlike those of a small music-box. At times they supposed that the sounds were caused by the wind playing among the twigs on the side of the mountain; but they found that this solution would not answer, as the same bushes were found everywhere, while the musical sounds were heard nowhere else than on the side of the mountain at the foot of which they were camped. They spent much time in scouting about and listening of nights and quiet hours during the day, and at last tracked the strange sounds to a great bed of small pieces of rock that covered the slope of the mountain. These bits of rock were found to be quite sonorous, and the miners concluded that the sounds they emitted were caused by the action of the wind among them. The gentleman who recently visited the mountain says he went to it expecting to find it a good deal of a humbug, but found it much more of a curiosity than he had anticipated, the mingled tinklings much resembling the sounds of an Æolian harp, and frequently attaining a startling degree of loudness and distinctness. The sound seems to rise and fall, approach and recede, as though caused or governed by the wind. On a close examination it was found that the small flakes of rock covering the face of the mountain contain a large per cent of iron. This iron is supposed to be magnetic; and there appears to be constant motion among the chips of it, which appear to cover the ground to the depth of several feet in many places. The whole drift of broken rock seems to be moving down the slope of the mountain with the slow, creeping motion of a glacier; and the slipping over each other of the fragments composing the mass is thought to cause the tinkling sounds, which are so numerous as to mingle and rise into a single strong musical murmur."

ACCIDENT TO A CHURCH. — The wind of Friday, Dec. 14, took from the Catholic Church at Newmarket, N.H., a portion of its roof, and carried it some thirty rods, striking the Baptist church with such force as to break two large holes in the side wall.

LARGE ELEVATORS. — The elevators in the towers of the palace of the Trocadéro at Paris are to be large enough to carry one hundred persons.

NEWGATE PRISON. — It is proposed to remove Newgate Prison, London, in order to make way for the new post-office.

REMOVAL OF TEMPLE BAR. — The work of removing Temple Bar began Dec. 12.

THE CATACOMBS AT PARIS. — That body of the municipal government of Paris that has in charge the public works of the city, has since 1875 spent about $50,000 in re-enforcing the vaults of the catacombs which underlie large portions of the city. Of this work, which will take fifteen years to finish, there is great need. It is said that at one time during the Second Empire Louis Napoleon was greatly in need of money, which he could obtain in none of the regular ways as the yearly budget had long before been exhausted. To meet the emergency he expropriated a large strip of land from either side of the Luxembourg Gardens, and offered it at auction for building lots. Fortunately it was declared that the catacombs whose galleries honeycomb the ground in that part of the city were not strong enough to support the weight of any buildings, and the emperor's scheme miscarried. If the vaults and piers of these galleries are now strengthened, the land may yet be built upon; for it has never been re-incorporated in the Luxembourg Gardens.

ST. GERMAIN-L'AUXERROIS. — The old church of St. Germain-l'Auxerrois, Paris, opposite the Louvre, is about to be thoroughly repaired. The side entrance in the Rue des Prêtres, which dates from the sixteenth century, will be restored to its original state; and all the statuettes of saints which adorned the arches of the portico, and which had been destroyed by time or by sacrilegious hands, will be reproduced. This is one of the most ancient buildings in Paris. It was built in the thirteenth century, on the site of a church destroyed by the Normans in the ninth. The sculpture of the galleries and gargoyles dates from the fourteenth. Numerous additions have been since made.

A VALUABLE MANUSCRIPT. — The National Library of Paris has been lately enriched with a most interesting manuscript, executed about the year 1520 at the Abbey of St. Denis. It consists of sixty-seven sheets of parchment which contain an account of the life of St. Denis, and of the monastery of the same name. It is illustrated by thirty very curious illuminated pictures.

THE WALLS OF COLOGNE. — The march of civilization, the changes in modern warfare, and the encroachments of trade are about to do away with one of the most interesting remains of mediæval life and customs in Europe. The fine old wall, which with its numerous towers and gateways forms a semicircular defence about the city of Cologne, has been found by the Prussian minister of War to be ill fitted to resist the attack of modern arms, and he has offered to sell it to the town. The municipal authorities are eager to buy it, intending to raze it to the ground, fill up the moat, and sell the space thus cleared for building-lots. Fortunately the government and the municipal authorities cannot agree on the terms of sale, and thus time is allowed for those who are interested in preserving the walls to take what steps are possible to prevent this archæological disaster. There are not wanting examples of towns where the modern city is wholly outside of the old walled town.

THE ORIGIN OF THE LAKE-DWELLERS. — The ancient lake-dwellers of Switzerland are supposed to be of African origin. One of the discoveries which point to this conclusion is the fact that the flax found in their dwellings does not belong to the species now generally cultivated, but to that which grows wild in Great Britain, France, and the coasts of the Mediterranean, and which according to Professor Heer was cultivated in ancient Egypt. Some of the seeds of the Egyptian flax are in the Museum of Bulaq, and it is proposed by means of them to clear up the doubt which still remains on this interesting point.

COLD-PUNCHED *vs.* HOT-PRESSED IRON NUTS. — An extensive and elaborate series of tests has been made by Professor R. H. Thurston, to determine the comparative strength of cold-punched and hot-pressed iron nuts. Every precaution was taken to insure fairness in the comparison. In respect to liability to stripping the thread, for instance, one nut of each kind was screwed on each end of the same rod, and the nuts were then pulled apart till the thread of one gave way. With only a single exception, in 180, the hot-pressed nuts gave way first. It was noticed that these yielded noiselessly; but when the rod was afterwards pulled out of the cold-punched nuts, stripping their thread, they usually broke in pieces with a loud report. From this and other tests it was decided that the cold-punched nuts possessed a much greater average strength than the hot-pressed nuts; the latter never reached the highest standard of strength of the former, but sometimes surpassed the minimum of the cold-punched specimens, because there was considerable variety and a wide range of strength in the iron of which the nuts were made. The makers of cold-punched nuts are of course delighted.

COMPARATIVE STRENGTH OF WOOD AND CAST-IRON. — Herr Hirn has been conducting a series of experiments in Germany on the comparative strength of wood and cast-iron in their different applications, and finds that in a great number of cases the former has the advantage. Professor Hirn finds the strength of the wood to be in direct ratio to its density; and this strength is increased by immersing the pieces of wood in linseed oil heated from 185° to 212° Fah., and letting the wood thus immersed remain for two or three days, or until partially saturated.

A NEW PRISON FOR NEW YORK STATE. — Mr. Pillsbury, Superintendent of New York Prisons, has called attention in a late report to the need there is of relieving the three principal prisons of the State by building another. He recommends the abandonment of the Dannemora Prison at Clinton, since because of its isolation it is very difficult and expensive to transport prisoners to it. Sing Sing and Auburn will still be enough for Eastern, Central, and Western New York, but there is absolute need of a prison convenient to the southern counties of the State.

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NOTRE-DAME

PARIS

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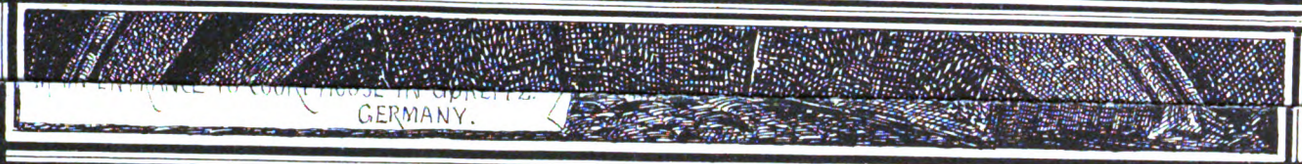
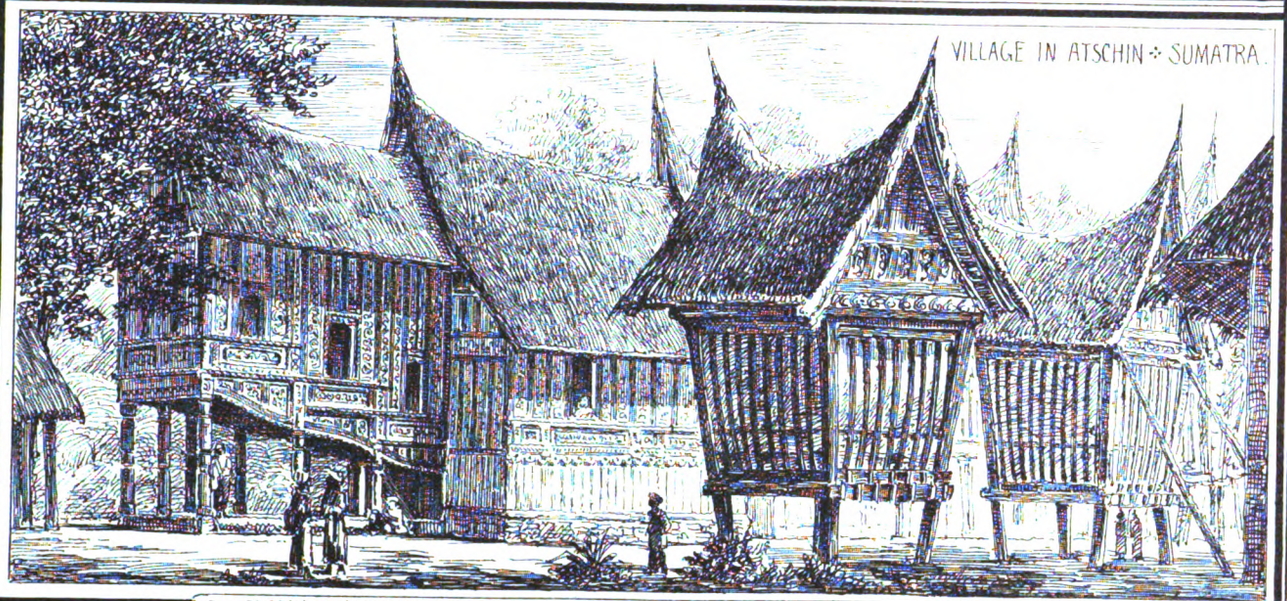
WALL PAINTING IN THE ROYAL PALACE IN DRESDEN REPRESENTING THE RULERS OF SAXONY FROM A.D. 1288 – 1464.



GERMANY.

HOUSE FORMERLY STANDING IN FLEET STREET LONDON ✣



VILLAGE IN ATSCHIN ✣ SUMATRA.

ROMAN POTTERY FOUND IN LOMBARD ST. LONDON A.D. 1735.

SKETCHES FROM A SCRAP BOOK ✣ L.S. IPSEN DEL. ✣

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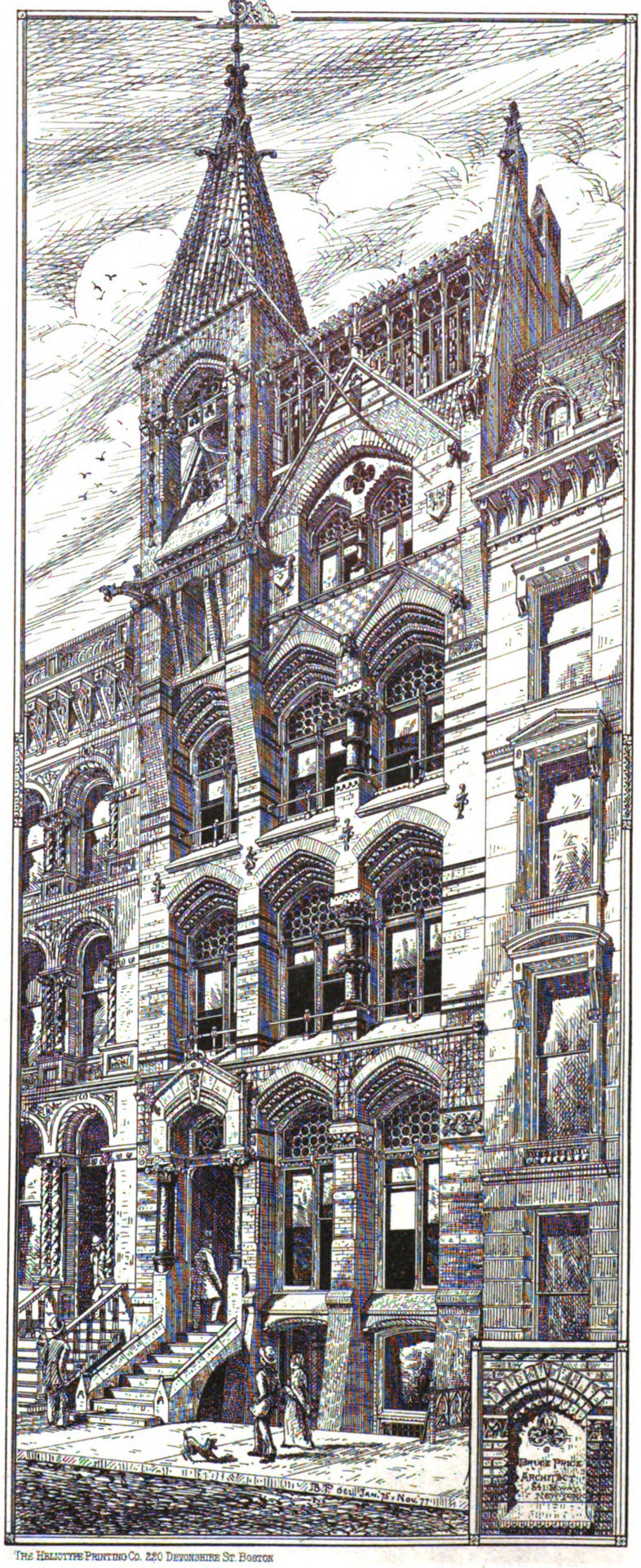
[CHRISTMAS NUMBER.]



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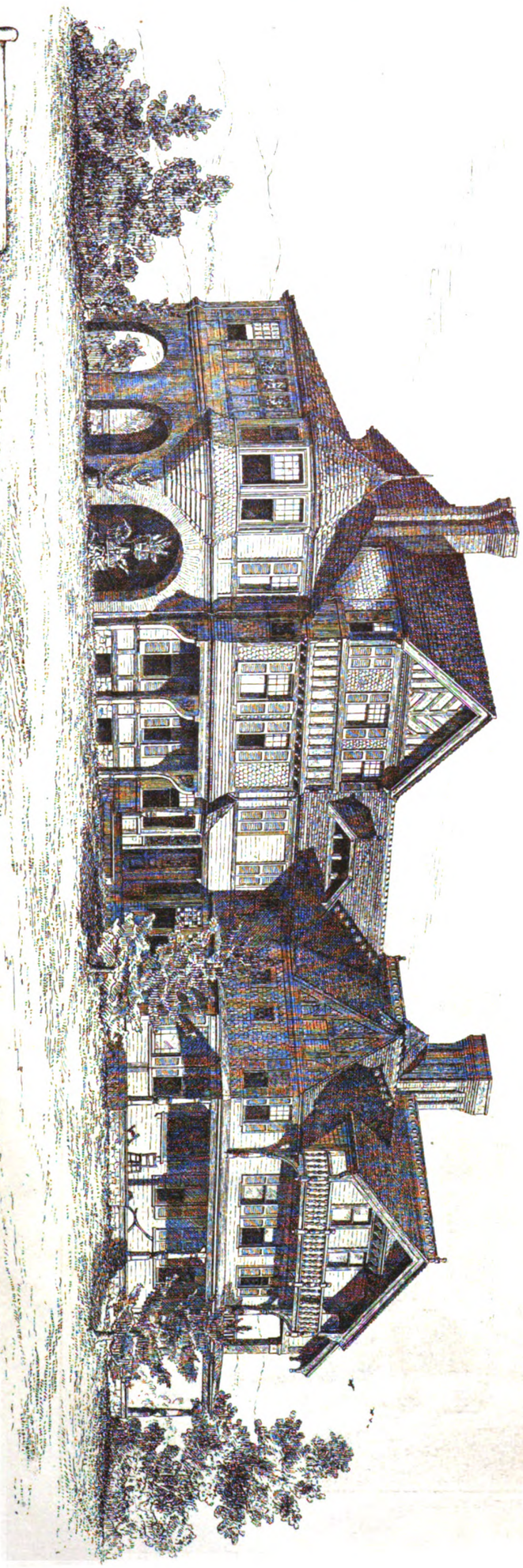
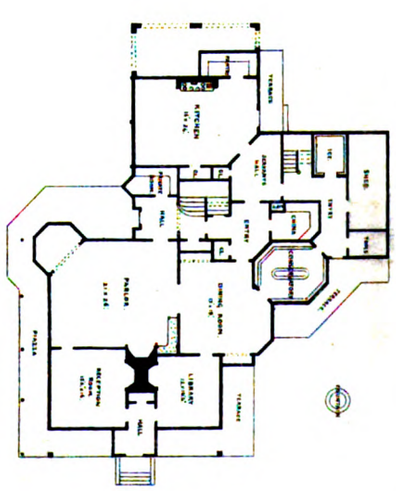
House at Milton.
Wm. Ralph Emerson, Archt.





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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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BOSTON, DECEMBER 29, 1877.

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THE destruction of Greenfield's candy-factory in New York proves one of the most puzzling as well as the most fatal of the fatal accidents to buildings which it has nowadays become a habit to record. A sudden explosion at about five o'clock in the afternoon tore away the front of the building; the interior took fire immediately, the floors went down, and in very little time the whole was burned. Of the one or two hundred persons in and about the building at the time, several are known to have been killed, and many others are wounded or missing. Until the official investigation into the disaster is finished we probably cannot be sure what caused it, — perhaps not then. The first theory, that it was a boiler-explosion, was disproved by finding that the boilers, which stood under the sidewalk, were uninjured. That the explosion was not in the basement or ground-floor seems clear from the fact that the persons on that floor got out with comparatively small injuries, and declare for the most part that the fire and *débris* seemed to come from above. The evidence is that the front was blown out laterally, probably from an explosion in a story above the first. Passers-by were buried in the rubbish thrown across the street. Those who came up first report that they saw the different upper floors exposed and people running about on them in disorder. Two witnesses testify to having seen a great ball of fire shoot high into the air, — possibly a mass of illuminated smoke, for it was dusk, such as often follows a confined explosion. The natural suggestion is that some explosive vapor, or an equivalent for it, had been generated in the process of manufacture; this may have been set on fire by the lamps, which must have been freshly lighted. There is a report, in fact, that two workmen declared that the fire began by the upsetting of a lamp in the starch-room, where finely-powdered starch was used in the manufacture of gum-drops. It is a fact that the dust of fine flour makes an explosive atmosphere. Severe explosions have occurred in flour-mills in Hungary, where very fine milling is done, the air being filled with fine particles of starch, which are decomposed almost as quickly as gunpowder. A good many more or less volatile essences, used in making candies, may have added to the danger. Until evidence can be taken as to what was going on in different parts of the building and just what substances were in use, and the people who were rescued from the various stories are examined, we shall perhaps get no further than these conjectures. Thus far there seems to be very little evidence from anybody who was in the upper part of the building. The accident may at least serve to remind us that after all candy-making is one of the businesses of more than common danger, and should be carried on under exceptional safeguards. In this case it seems to have been done with great carelessness. Both the engineer and his boiler were at least looked upon with suspicion, it is said; the building was evidently very inflammable in its construction, — it was not destroyed by the explosion, but was burned with surprising rapidity, — and to make things as bad as possible, it was lighted with kerosene.

THERE is a story in the New York papers that the problem of rapid transit is to be solved for the people of that city in an unexpected way by aid from without. It is said that certain Londoners, stockholders in the underground railways that have proved so successful in London, after carefully considering the case of New York, have formed a company to build such a road there. The suggested line of the road is parallel with Broadway on the east side, and extending, for the present at least, only from the Battery to Forty-second Street. An underground railroad has been one of the means proposed before for transit in New York; but so far as we know, there has not heretofore been any serious attempt to secure one. The "lay" of the city is peculiarly well suited for such a railroad, the whole travel being up and down one line. The road in London has been successful enough to encourage copying it elsewhere. It is not a very comfortable, or except for the quickness of the passage, a very wholesome means of travel, but it is run with a promptness and precision that surprise the traveller, and make it, in spite of its circuitous route, extremely convenient to residents. In New York its quickness and directness would doubtless make it very popular; and the comfort could not be less than that of crowded horse-cars. It would at least avoid that dread which we should think would continually overhang the dwellers under the line of the elevated railroad. At the same time it might prove very difficult to construct if, as we suppose, there is a good deal of ledge in the way below the surface. The buildings in the neighborhood of Broadway are carried deep into the ground; and to pass under them the road would have to go far down where blasting would be very costly and difficult, if not hazardous.

THE Rome correspondent of the Boston *Daily Advertiser* gives a curious account of the discovery of old MSS. and other things of historical interest in the *Collegio Romano*, the famous Jesuit college at Rome. When at the time of the recent sequestration of church property and the suppression of the Jesuits, the Italian government took possession of the college, they found that many valuable articles, recorded on the catalogues of the library and of the famous Kircherian Museum, were missing. Interrogation of the Jesuit fathers failed to discover any of these things; and they were given up as lost or at least irrecoverable. But a short time ago two ex-Jesuit *frati* offered to show the government where the Order had concealed its treasures before abandoning the building. Accordingly under their guidance the officers of the government found in an upper chamber of the college, between the floor and the ceiling of the room below, a collection of some four thousand old MSS., books, maps, and valuables. Among them was a copy of the constitution of the Society of Jesus, beautifully printed on parchment in 1593, the only one known to exist. There was also a *Florilegium*, or collection of colored drawings of garden flowers, very carefully and skilfully made, it is said, and bearing date 1678. A rich and curious map-case was found, a cylindrical box of stamped leather opening at the end, with hinge and lock, and enclosing three cylindrical sheaths in which were maps, the oldest of them dated 1455, of the kind called *portolani*, that is, having the seaports prominently displayed. The betrayers of this hiding-place profess not to have found in it what they expected; and since many valuables which are known to have been in the college are still unfound, it is believed that many remain hidden away. The thick walls of the Roman buildings, and the intervals between the brick-arched ceilings and the wooden floors above them, give unlimited opportunities for concealment; but since interrogations and judicial inquiries fail to draw any information from the Jesuit chiefs, there would seem to be no alternative but either to pull the college to pieces in a random search, or to await the result of accident.

A SHORT time ago Mr. White, R. I. B. A., from whose earlier paper on French houses we quoted some time ago, read before the Institute a second, in which he urged the adoption in London of the system of apartment houses. He took for an example a block or square between four streets, fronting

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on Regent Street, with an area of 220 by 100 feet, and belonging chiefly to the Crown. At present the block is covered by a series of shops seventeen feet wide, a dozen on each principal street, and each shop with a house over it. The street-fronts on the side streets are filled in with a house or two, so that there are in all twenty-six inferior houses with some hundred and fifty rooms, and twenty shops, in this block on the most fashionable business street in London; the inner yards, shut in from all the streets, being covered mostly with additions to the shops. Each house has its entrance on the street, which therefore cuts off something from the frontage of the shops. For this, Mr. White proposed a plan which divided the whole block into three parts by party-walls, putting on each a house of apartments varying in number of rooms from five to fourteen, or in all one hundred and thirty rooms. In each division was an interior court, and wide archways gave access and circulation of air from the streets. The number of shops thus provided was about the same as by the present plan; and owing to suppression of the front doors of the houses the street frontage of the shops was very nearly the same as before, although he had so set back his walls as to lose thirty feet of the perimeter of his block for the sake of widening his streets. In addition to this, most of the shops were provided with a *mezzanine*, or half-story, and a basement, both of which they had lacked before. The accommodation thus presented seemed from the accounts given to be distinctly better than that which it was proposed to replace; the rooms confessedly superior, grouped into more satisfactory tenements, and better arranged for access, light, and air, while the arrangement for shops was more advantageous both for room and display. The prominence of the example chosen and the definiteness of the improvement proposed gave Mr. White's project the importance of a test case. The question of the adoption of some such change in the accepted ways of building is becoming more and more urgent in London as it appears clearer that the present ways do not suit the demand.

THE English building journals which have last come to hand contain reports of the discussion at the Royal Institute of British Architects on Mr. White's paper, which show the interest that is excited among English architects by the question of introducing "flats" or apartment houses into London. There is ample reason for raising the question, for the average Londoner, we are inclined to believe, is worse housed than the dwellers in any other great and active modern city. A good deal was said in the course of the discussion to favor Mr. White's idea of building in flats, but the general feeling seemed to be one of conservative distrust. Different objections were raised, of more or less weight, — the high rents which apartments in such houses are expected to bring; the fact that the use of such houses in the Scotch cities where the system had been common was diminishing rather than increasing; the inconvenience of having the footpavements crossed by carriages entering and leaving the court-yards. The President thought that the French system as displayed in Mr. White's plans allowed too little room for domestic service; and one member did not see what could be done in such apartments in this respect, unless they were all to turn French cooks — than which, the foreigner who is experienced in English dinners may think, worse things could happen. The serious objections which were urged against adopting the system itself, apart from the special form in which Mr. White's plans presented it, seemed to resolve themselves into two, — that it was not in accordance with English habits of life; and that the tenure of land in London, the ground being let out in small lots on ground-leases, was opposed to it.

THE first obstacle is one which may be expected to disappear in England, and in our own country, where somewhat analogous conditions prevail though in a less degree, as fast as experience can be made to show that a new system is really adapted to the real requirements of modern city-life. President Barry objected that what Mr. White proposed would revolutionize not only the Englishman's house but his mode of life. No doubt this is true; yet it is the natural tendency of men to adjust their modes of life to the outside conditions that surround them, and to this the firmest traditional habits give way in time, with more or less rapidity, according to the natural pliability of a people. The ruling requirements of modern city habitations are the special ones for the average city man, nearness to places of business and amusement, convenient provision of water, gas, and sewage; and the universal ones, economy of space and of building-materials, access of light and air. The special ones are obviously best secured by compactness of housing, bringing as far as possible business, amusement, and dwellings upon the same area, which is most directly accomplished by putting one over the other in different stories, as is done in most great Continental cities. There will probably always be many people whose tastes and power of living as they please will lead them to choose separate houses more or less outside the crowd; but as long as city life continues as engrossing and active as it is now to business-men and many others, it is likely that the tendency to the more compact ways of living will grow among the masses of city people. The great increase of hotel boarding in late years is the extreme manifestation of this tendency, for which apartment houses offer a better provision. The trouble has been in American cities thus far that disproportionately high rents have been expected for suites in such houses; but this does not seem to be a necessary condition. In the abstract there seems a natural economy both of space and building-materials in favor of the apartment system. Floors are cheaper integuments than walls; and by laying houses on their sides, one upon another, the shell of each is made to contain a greater proportion of floor and less of wall than when they are set upright side by side. Instead of four stories of stairs, single or double, it is necessary to provide only one. Halls and corridors are diminished in proportion. As for light and air, it is clear that in densely compacted areas of building the advantage ought to be on the side of apartments, for the portions of space that can be assigned to these for each house are made much more efficient by being thrown together in large areas, than when they are cut up into small wells. Here seems to be the essence of the question of economy, and the actual result seems elsewhere to have corresponded to these indications; if it has not yet done so with us, it is because the problem has been insufficiently studied, or because the apartment houses have been of a more expensive class than the average private houses. That they require to be better built than the common cheap contract houses in cities, is doubtless true; but to one who believes in thorough building this is not an objection.

THE second obstacle, the system of ground rents which is customary in London, is seriously in the way of this or any other kind of improvement, and deserves the attention of those cities in the United States, Philadelphia especially, where a like system is common. The land, of which a large share belongs to the entailed estates of great noblemen, is apt to be cut up into little lots of twenty feet front or so. These are let out separately on long leases to tenants who build on them subject to the approval of the landlords. This tends to a conservative policy in building, which does not meet the wants of the time. The tenant who must for his own needs build him a shop is compelled by the landlord to put a house of the ordinary type over it, and then finds that it commands little or no rent. It is said that there is a very large number of such houses in the middle of London for which proper tenants cannot be found. Under such circumstances the lessee is tempted to build as slightly and cheaply as the vigilance of the landlord will allow. Since the house goes with the land at the expiration of the lease, there is no inducement for the tenant to keep it in condition except so far as he is compelled to; and as a matter of fact a great many of the buildings on these great estates in the heart of London are in a condition which a thrifty American would resent as a disgrace. Some time ago, Mr. White says he appealed to the Duke of Bedford to allow some changes in the treatment of his London estates. Mr. White found that the duke's agent's idea of the proper building for a London lot was "a house sixty feet high, supported on a shop eighteen feet wide;" and this on or near the Strand. But of late years concession had sometimes gone so far that a tenant who had hired two adjoining lots had been allowed, though he was compelled to build a party-wall between them, to cut a door through that wall, and connect his two houses. The most formidable obstacle

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to improvement, however, is the fact that, the lots being parcelled out in separate leases, these leases do not expire together, so that the difficulty of throwing lots into one for any well-considered scheme of general improvement is very great. We have already spoken of the difficulty which this system of leasing the ground has opposed to the effort of the Institute to secure a reasonably consistent treatment of the frontages on the great new thoroughfare, Northumberland Avenue.

VITERBO.

[Illustrated.]

ONCE Viterbo lay on the regular road between Rome and the north; but now the train leaves the traveller at the little station of Orte, whence the diligence takes him the rest of his journey across the Ciminian hills.

The town of Orte itself is not visible from the station, but is reached by steep roads winding through olive orchards and vineyards. Scattered up the side of one hill are wayside shrines that border the road to what seems a chapel at the summit; while farther on, perched on the crest of brown, straight, buttressed cliffs, the old town topples over the turns of the road, and, like many Italian cities, is so brown and gray and weather-stained that it seems a natural growth on the hill-top which its threatening sides crown. It is peaceful enough to-day, a February sun bathing the slopes where women in the laced bodices common to the neighborhood are hard at work at that perpetual but apparently futile washing to be seen throughout Italy. The banks are strewn with the drying clothes, while the washerwomen twirl the yarn from their distaffs and gossip with their neighbors, or file up the fields with the baskets of clothes on their heads. Black-skirted priests meet on the road and embrace each other, and here and there we encounter ponderous gens d'armes, and countrymen wrapped in great cloaks that fall with the folds of classic drapery. Our horses are driven with rope reins, but are decked with great red tassels at their ears, and jingling bells, — "to sound," the driver explains; and they do sound very cheerily in the winter morning.

The road winds up among the hills by the quarries where blocks are cut for the new buildings in Rome; and as the morning passes we reach high land, a flank of the Mons Ciminius, which dotted with cloud-shadows rises near us. Here in the oak woods, on whose boughs the russet leaves of last year still hang, we overtake a party of contadini astride of donkeys; and after much chattering and leave-taking some of them join us.

Bagnaia is the only town we pass through. It clings to the hillside, and we dash up its narrow, black, noisome streets, and out upon its little piazza to find the carnival in full blaze. A grim old castle forms one side of the piazza; and its round machicolated tower looks down on a lively crowd of maskers, who in all sorts of costume, shouting and chaffing each other, encircle the piazza in procession, while in one corner gently patter the waters of a great Renaissance fountain. So by sunset we reach the gates of Viterbo, and with cracking whip rattle up its stony streets to the inn.

The buildings are mainly of dark volcanic stone, gray and black, and the sunlight straggles into its narrow, steep, tortuous streets with some difficulty even at noon; but this city of fountains is picturesque enough by night or day; and groping that evening through the dusky lanes that are often arched over by the crowded houses, I was enticed on by the gentle spatter of running waters from one fountain to another. It is however as a pretext for designing the fountains that this fine supply of water has been chiefly useful. I saw but little other effect of it; and when the old servant at the inn disposed of the water left in the bowl by the previous occupant, on the tile-floor of the adjoining room, and felt that every thing possible had been done for my comfort, it seemed to me that the inhabitants undervalued their privileges.

Viterbo is crammed with "bits" to please an artist. The fountains are picturesque; but to go from one to another you pass through steep, ill-kept, arched streets fascinating enough in themselves. Here and there are remains of the square war towers that once were found in most Italian cities, and that now lean over Bologna, and of which ten or more still crown the hill of San Gemignano. The buildings of most Italian cities are marked by local peculiarities. Often, as at Siena and Orvieto, they follow the type of the great city palaces; but here, where there are no great buildings to imitate, the outside entrance steps give a character of their own to the houses, which are mainly at one scale and suited to the needs of modest nobles or prosperous merchants.

Half way up the wide hospitable steps that run along the house wall, is a door in a stone frame which seems to block the promised welcome, while for those who pass it a balcony is bracketed out from the main landing opposite the real house door. Here the women knit, and the children peek at the stranger who sketches them. Beneath the balcony, carts are stored and the cellar is entered, while at its side is perhaps a shrine and a lantern; for the march of improvement has not led to what I elsewhere recall, — a gas-lamp piously placed before a street shrine. Over and over again one meets this type of entrance, rich and plain. At the palazzetto it is the frontispiece to a dignified round-arched twelfth-century house, and from that other examples occur leading down to a late period of the Renaissance.

At the Gatteschi fountain which Nesfield sketched and Verdier and Cattois have illustrated, one notes the firm, clean central shaft, the bracketed bowls of the choicest contour, and the refined Gothic lettering, while the water starting from lions' heads below the shaft crosses the great basin through ancient bronze conductors to within reach of the water-carriers. In another street a little jet flows into a basin from a pinnacle set on another foliage-crowned shaft. Again, a great stately Palladian fountain with many ranges of steps and succeeding pools forms the centre of a large, lonely square, which is the more tranquil by contrast with the rattling drumming on the neighboring parade.

The town is crowned with church towers, coursed with colored masonry, roofed with a cone of tiles, and with meagre tracery in the openings; while on the hill-top, hard by the cathedral tower, is the ruined palace of the bishops, with a great arched entrance, stone stairs, and a fountain in the hall. Its lofty side is propped by huge flying buttresses, completely spanning the lane that skirts the great building and descends into the valley.

Wandering on in the midst of a tangle of alleys and arched byways, one enters a little piazza that seems like a scene set for the stage. Several alleys more or less arched converge in the little place, which is draped with the underclothing of the neighborhood. One side is formed by what must once have been one of the great houses. The staircase is not outside, but apparently runs on the inside of the wall, its landing being arched to the open air by a very wide segmental arch enriched with dog-tooth, while a great bracketed balcony beneath it projects from this loggia into the square itself. By its side is another similar entrance, while yet another side of the place is formed by an arched portico, and then the lanes that meet here go off under other vaults, and to other steps and turnings.

To a student of architecture, fresh from Rome, nothing could be more enchanting than all this well-preserved mediæval city. In Rome, with all its interests, one is burdened with antiquity. Prehistoric times, Pagan Rome, the Dark Ages, the Renaissance, and the fertile fancy of Bernini, all seem leagued to bewilder him. What one set up, the other has knocked over and turned to his own use. It is therefore vastly refreshing suddenly to find one's self amid surroundings of such perfect harmony. The details are of that firm and noble character to be seen at San Gemignano, and in a measure at Verona; not the twisted and braided shafts of Orvieto and Siena, nor the unbuttressed, cusped arches of Venice. These hardly occur; but plain shafts carry the weights, and the arches are more often round than pointed. It is a city too of stone building, and it is this that gives it its dignified character. The stone is apparently very hard; for there is little or no foliage carving, although a rich six-leaved dog-tooth serves frequently for enrichment. The work seemed like the round-arched work at Verzelay, or the stone-work of Perigueux, but more choice; and in the enthusiasm of a holiday this little unscathed city of the twelfth century seemed in point of picturesqueness and preservation to be to its neighborhood what Chester and Rouen are to theirs.

But it is not as a perfectly unchanged mediæval town alone that Viterbo interests the architect. There is little, it is true, to be seen there to suggest its close connection with a vast antiquity; nor does the town contain many memorials of the Rasena as they called themselves, or the Etruscans as we know the race that once ruled the plains around the city. Here through many centuries of national existence lived and flourished a people that gave in great measure to Rome her priesthood, her state-craft, and even her early kings, and who in turn fell before her growing rival, and has been almost blotted from men's thoughts. Their successors on the soil seemed however to care little about these great ancestors; while I, fresh from such fragments of Dennis and Mrs. Gray, Taylor and the rest, as I could lay hands on, was deeply interested in them.

Was Virgil right, and did Æneas and his wandering band stand for the great migration from the shores of Lycia of a race that subdued both a previous Pelasgic one and the aborigines that they had conquered? Is Taylor misleading us when he makes them a much more Northern race, the first cousins of the Fins, taking their origin in the Siberian steppes, wherever that may be; or did they come from Rhœtia, or were they a lower class that in their turn had come to rule? Who knows? Here they lived however, a conquering race, probably far from their native lands; and as an aristocracy of conquest, they perhaps the more readily disappeared at the end. Wherever they came from, after many centuries of national existence, isolated amid other races like the Magyars in Austria or the Turks in Europe, they disappeared. A race of powerful character, they left records of themselves in bridges and aqueducts, in sewers and other engineering works; and in their tombs was buried what little we know of their life. Here we find paintings, utensils, ornaments, and many thousands of vases; inscriptions too, — unintelligible until the discovery of an inkstand on which some idler had written the vowels and then written them again in syllables, an Etruscan Rosetta stone. But, after all, our interest in these people is but secondary. In truth, our chief interest is in those features of custom and character which their

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mighty conquerors assimilated. Again, what we find in their tombs of artistic value is not so much their own work as that of Greece, — a spirit of conquest, energy in political orgazniation, and utilitarian aims in construction, the practice of sorcery and augury, and a belief in the deathlessness of the soul, in ancestor-worship, and the idea that the dead could still use the utensils, arms, and ornaments of life. Most of these and much more can be traced as bred and quickened in the Roman character by the race that shared their early history, and that they so early subdued; and, secondly, the contents of their tombs indeed shed much light on the art of Greece and Egypt; for commerce and politics brought all the Mediterranean races together even in those days. Greek writers speak of Etruscan gold cups and household bronzes as the best of their kind, and Phidias gave his Minerva Etruscan sandals; and so while rock-cut tombs and pyramidal tumuli, and the ochre paintings of Tarquinii, and the scarabei of Vulci, recall Egypt, the painted vases found in most of the tombs of Etruria not only recall Greece, but are largely actual Corinthian importations. Thus while the ashes of Vesuvius preserved in a Roman city the Greek art of a later day, the tombs of the Rasena kept for us thousands of fragile vases of the earlier and best periods of Greek art.

In view of this their great history, a pilgrimage to one of the great cemeteries of the race that lies near Viterbo offered much interest. The inhabitants of the town seemed to know and care but little for the Rasena, but one of them professed to have been to Castel d'Asso, which lies some three or four miles distant; and so together we set out on one of the few available conveyances. The road ceased long before we reached there; and as we trudged over the brown moorland, I found it was fifteen years or so since my guide had been to the great valley, and he knew but little more of it than I did. The plain over which we wandered is traversed in various directions by huge gullies with precipitous sides. Into one of these we descended, opposite the ruined Castel d'Asso.

A short valley runs into the great ravine opposite the mediæval castle, and the tombs occur on both sides of this, while they stretch for half a mile or so up one side of the long valley. They are at the top of the ravine's side, and the crest of the rock is cut into long running cornices which crown the valley with a simple profile of Egyptian character. The doorways have architraves with projections at the lintel. They are simply carved, and the real entrance is ten feet or so below and underground. The walls of the tombs are often niched for the sarcophagi; and the hewn solid rock forms the low vault.

We invaded several of these rifled tombs by the light of our pitch torches; and judiciously yielding the precedence to my Italian guide in entering these black holes in the wilderness, I looked in vain for valuable relics. However, we made no Schliemann discoveries, and had to be contented with February violets growing at the doors of the ancient sepulchres.

It is at this spot that Mrs. Hamilton Gray, on what grounds I know not, places the great temple of Voltumna, the protectress of the Etruscan league. She says, in her "Sepulchres of Etruria," "In its immediate vicinity were the rocks dedicated to be the sepulchres of those whom Etruria honored and mourned, the high captains of the league, the high priests, the distinguished patriots, noted orators, dreaded warriors, or beloved and wise kings: those, in short, to whom the whole nation gave a grateful burial, and for whom they wept." It is such suggestions as this, and the remembrance of such great collections as those I had seen at Chiusi, at Florence, and of other tombs at Perugia, that gave interest to these carved and burrowed cliffs.

The sombre precipices that hem in this fertile valley contained but one of the cemeteries of the Rasena. Near by at Bieda, the rock-side is again honeycombed with caves; and at Norchia also, not far distant, exists a very rich stone pediment carved in the rocks. But while in Northern Etruria these caves or grottos are found, in the South on the contrary, as at Cervetri, the tombs are burrowed out of the tufa, and have the character of tumuli. Tarquinii is surrounded by thousands of tombs; and Lars Porsena may, as tradition says, have lain in the great labyrinth that exists beneath the town of Chiusi, the ancient Clusium.

In many tombs the inscriptions change with later burials from Etruscan to Latin, as in different places or at different epochs the custom of burial prevailed more widely than that of cremation. Bronzes, vases, ornaments, and scarabei, — such are the "finds" gained in still unrifled tombs; while the most numerous prizes are vases, — the earliest rough and archaic, then stiff and quaint with black figures on a red ground, and then the red figures on a black ground, representing stories of gods and heroes or domestic scenes, and often signed by the Greek artists. All around the interior of the tombs once lay the long awkward effigies of the departed, swathed in ungraceful folds, just as from the tops of the urns that held their bodies, they now in so many museums pledge from their sacrificial cups the inquisitive and hasty tourist.

As the chill of the evening settled down we drove back; the view sweeping over the great rolling land where the Rasena once lived and ruled, the domed heights of Montefiascone rising grandly on one horizon, and the grim Ciminian mountain closing the view behind the town. We dive into the dim lanes; the fountains still patter, the streets ring in the sharp air with the *Rondinella d'Amore* that I have learned to think a part of Viterbo. I find the inn again which Majesty is said to have occupied; and so by degrees I get back to the life of to-day, and even mediæval Viterbo seems almost modern.

R. S. PEABODY.

THE ILLUSTRATIONS.

SKETCHES MADE IN VITERBO AND ITS VICINITY BY MR. R. S. PEABODY, ARCHITECT.

SEE the foregoing article.

STORE ON BROADWAY, NEW YORK. MR. G. E. HARNEY, ARCHITECT.

This is the original design for the store built for Mr. Theodore B. Starr, 1126 Broadway.

HOUSE FOR P. S. JENNINGS, ESQ., CLEVELAND, O. MR. F. S. BARNUM, ARCHITECT.

HOUSE FOR W. H. SAGE, ESQ., ITHACA, N.Y. MR. W. H. MILLER, ARCHITECT.

THE VENTILATION OF SCHOOLHOUSES.

[A paper read at the Social Science Congress held at Saratoga by Mr. A. C. Martin, A.I.A.]

THE result of my experience and practice as an architect in the ventilation of schoolrooms is decidedly in favor of the system of natural ventilation by means of an exhaust-shaft. I mean a well-built brick shaft, carried up inside of the outer walls of the building, and connected with the different rooms by properly proportioned air-ducts.

Such a system is best for schoolhouses: 1st, because, if well planned, it is thoroughly efficient and easily managed; 2d, the cost of the shaft and ducts forms but a small item in the cost of the building; 3d, the cost of ventilating, *per se*, during the cold season is nothing. In this respect it has the advantage over any system of fans or blowers. During the mild days of late spring and early fall, a moderate fire of trifling cost, kept burning in the shaft, will insure an active ventilation.

Of course it is understood that in any system of ventilation, it will cost more to heat a room that is well ventilated than one that is not. To warm a room where the air is renewed four times an hour, and heated from say 20° to 70° Fah., requires more fuel than to heat the same room when the air is not renewed or changed at all.

The power of a vertical shaft to ventilate a building depends upon the following conditions: viz., 1st, The difference of temperature between the out-door air and the air in the shaft, i.e., the air in the building; 2d, upon the height of the shaft; 3d, upon the resistance or friction, i.e., the straightness and smoothness of the shaft; 4th, upon the supply of air which is to take the place of that drawn out by the shaft.

The following equations show these relations, or the law for the flow of air through such a shaft: —

$$\left.\begin{array}{ll} \text{1st.} & V = K\ \sqrt{(T-T')H} \\ \text{2d.} & Q = KA\sqrt{(T-T')H} \end{array}\right\} \text{in which}$$

V is the velocity of the air in the shaft; K is a numerical co-efficient dependent upon the form, disposition, etc., of the shaft, and is constant for each shaft; T is the interior temperature; T' is the exterior temperature; H is the height of the shaft; A is the area or cross-section of the shaft; Q is the volume of air passing through the shaft in a unit of time.

By an inspection of these equations, it will be seen that to increase the velocity of air in the shaft, and also the amount of air evacuated in a given time, we must either increase the height of the shaft, or the excess of the interior above the exterior temperature. For instance, to double the amount of air passing through a ventilating shaft, we must quadruple the height of the shaft, or the difference in temperature. Or we may double the area of the shaft, other conditions being equal, which is much more economical. From this we see that in any given case of ventilation by this system, the height of the shaft is of less importance than its size or cross-section. It should, however, always be carried well above the roof of the building, and should never be larger than required to exhaust the necessary amount of air at the minimum velocity.

Without going into theory, I propose, in what I have to say, to give the results of careful observations upon the working of this system in two buildings where I have used it. One is a public grammar school of ten rooms, presenting rather a complicated case, because the air from all the rooms is drawn down into the basement, and delivered at the base of the shaft. The other is a small private school building.

The grammar school building has five rooms in the first story, and five similar rooms over them in the second story. Plan A shows the first story of this building. The horizontal air-ducts under the floor of the basement leading to the foot of the shaft are plainly indicated. The circles show the vertical air-ducts from the rooms to the collecting-ducts in the basement. The circles in

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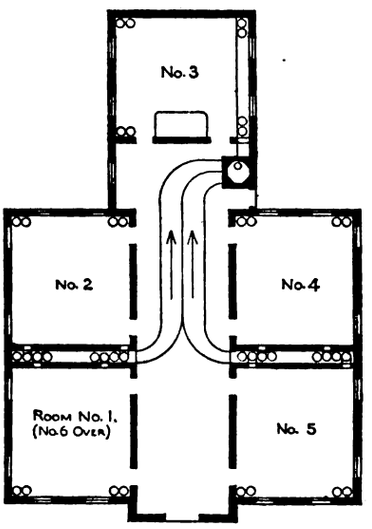
the corners of the rooms show the hot-air ducts from steam-radiators in the basement.

The ventilating-shaft for this building has an effective area or cross-section of 19 square feet. It is 65 feet high. An iron smoke-pipe from the steam-boiler passes through the whole height of the shaft. A steam-radiator is also placed inside the shaft. Two vertical foul-air ducts from each room lead to the base of the shaft by means of the horizontal collecting-ducts. The building is heated by steam from radiators in the basement. Each room has two hot-air pipes and four independent radiators, so that one-fourth, one-half, three-fourths, or all the heat may be turned off from the rooms without stopping the flow of fresh air. The ten rooms are all of the same size, viz., 28′ x 30′, 12½′ high, planned for fifty children.



PLAN A.

The sizes of the shaft and foul-air ducts were calculated upon the basis of exhausting from the rooms 15 cubic feet of air per minute for each child, or 750 cubic feet of air per minute for each room, and 7,500 cubic feet per minute for the whole building. This required that the air in each room should be renewed four times an hour. At different times, and under different conditions of temperature and weather, I made three sets of observations, measuring the flow of air through each of the twenty foul-air ducts, and through the shaft, by one of Newmann's anemometers. I found the measured velocity of the air-current in the shaft, and the theoretical or calculated velocity, to be nearly the same in each case.

I used the following equation: —

$$V^2 = \frac{2gHa(T-T')D}{D+2gHK}$$ in which

V = velocity (in feet per second) of air in shaft.
g = acceleration of a falling body in shaft . . 32.2 ft.
H = height of shaft . . . . . 65 ft.
a = expansion of air for each degree Fah. . . .00204
T = in-door temperature.
T' = out-door temperature.
K = co-efficient for friction in shaft 0025
D = diameter of the shaft . . . . . 5 ft.

For instance, Feb. 10., —

Out-door temperature . . . . . 36° Fah.
In-door temperature . . . . . 68° Fah.
Difference of temperature ($T-T'$) = . . . 32° Fah.
The measured velocity of the current in the shaft was . . . . . 9.1 ft. per sec.

By substituting values in the above equation, we have $V^2 = \frac{64.4 \times 65 \times .00204 \times 32 \times 5}{5 + 64.4 \times 65 \times .0025} = \frac{1366.3104}{15.465} = 88.3$; therefore $V = \sqrt{88.3} = 9.4$ ft.

Feb. 22. — A clear cold day, with a strong wind from the North-west.

Out-door temperature . . . . . 18° Fah.
In-door temperature . . . . . 60° Fah.
Difference of temperature ($T-T'$) . . . 42° Fah.
Measured velocity of air in shaft, mean of two observations . . . . . 11.1 ft. pr. sec.
Calculated velocity by the equation . . . 10.7 ft. pr. sec.

March 7. — North-east snow-storm.

Out-door temperature . . . . . 30° Fah.
In-door temperature . . . . . 69° Fah.
Difference of temperature ($T-T'$) . . . 39° Fah.
Measured velocity of air in shaft, mean of two observations . . . . . 9.4 ft. pr. sec.
Calculated velocity by the equation . . . 10.3 ft. pr. sec.

It is stated above that the shaft was expected to exhaust from the building seven hundred and fifty cubic feet of air for each room per minute. Here is the result of independent measurements of the flow of air from the ten rooms, each room having two foul-air pipes and two fresh-air pipes, — all doors and windows being kept shut.

Feb. 10. — Valves of all the cold-air boxes shut. Air supplied to the radiators from the basement. The total flow of air from all the rooms was 7,855 cubic feet per minute, an average of 785 cubic feet for each room. From room No. 6, in second story, farthest from the shaft, the flow of air was only 410 cubic feet per minute, while from room No. 3, in the first story nearest the shaft, the flow was 1,177 cubic feet per minute; these two were the extreme cases. In two other rooms the flow of air was less than 750 cubic feet per minute. In seven rooms the flow of air was in excess of this amount. It was stated above that the observed velocity of the air in the shaft was for this date 9.1 feet per second. This multiplied into the area of the shaft (19 feet) and by 60 will give the total flow through the shaft, 10,374 feet per minute. The total flow from all the rooms was 7,855 feet per minute; a difference of 2,519 cubic feet of air not accounted for. Two independent air-ducts from the water-closets to the base of the shaft will account for a part of this excess; and doubtless the air-ducts let in considerable air through their joints, which could not be measured. The cold-air boxes being closed, the inflow of air to the rooms was not free enough for a vigorous ventilation.

In the two following observations the air-boxes were kept open:

Feb. 22. — Total flow of air through all the rooms, 12,318 cubic feet per minute; an average of 1,231 cubic feet per minute for each room. The two extremes were for room No. 6, second story, 666 cubic feet per minute; room No. 3, first story, 1,956 cubic feet per minute; only one room (No. 6) having a less flow than 750 cubic feet per minute. The observed velocity of the air in the shaft was for this date 11.1 feet per second. This multiplied into the area of the shaft and by 60 will give the total flow of 12,654 cubic feet per minute.

March 7. — Total flow of air through all the rooms, 10,110 cubic feet per minute; an average of 1,011 cubic feet per minute for each room. The two extremes were: 702 cubic feet per minute in room No. 6, and 1,296 cubic feet per minute in room No. 3; only one room (No. 6) having a less flow of air than 750 cubic feet per minute. The observed velocity of the air in the shaft was for this date 9.4 feet per second. This multiplied into the area of the shaft (19 feet) and by 60 gives a total flow of air through the shaft of 10,716 cubic feet per minute.

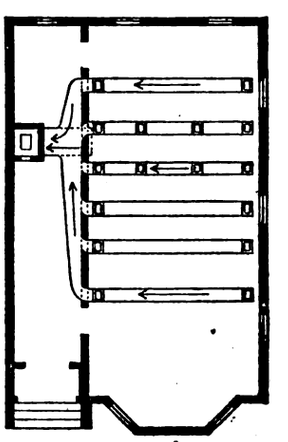
I found that the force and direction of the wind have a decided effect upon the ventilation; which is most active on a windy day, other conditions being the same, and more active with a north-west wind than any other. The flow of air from the rooms on the windward side of the building was greater than from the rooms on the leeward side. The distance of the rooms from the base of the shaft was always a factor in the ventilation of the rooms. For instance, room No. 6, in the second story farthest from the shaft, and room No. 3, in the first story nearest the shaft, were the extreme cases; but generally, the nearer a room to the shaft, the more free the flow of air through that room.

The flow of air through the rooms was always much less when the valves of the cold-air boxes to the radiators were shut, and air for them taken from the basement.

The measured flow of the air through the shaft was always in excess of the sum of the measurements of the ten rooms.

The velocities of air-currents through the ventilating registers of the rooms varied from two to six feet per second, according to the location of the room with regard to the shaft, and the direction of the wind.

The private-school building contains one large room in the first story, and four recitation rooms in the second story. The rooms are ventilated by a brick shaft fifty feet high, having an effective area of eight feet at the bottom. The air-ducts for each story are carried into the shaft at the level of the floor of that story, and not down into the basement as in the first case. I shall refer to the ventilation of the large room in the first story, which is 20 feet wide, 45 feet long, 14 feet high, and planned for fifty girls; giving an air space of 250 cubic feet for each. Plan B shows this room with the ventilating-shaft at the left. The air-ducts at the level of the floor are indicated as before. Sixteen registers (shown on the plan) open into these ducts. At the top of the room nearest the shaft, shown by the dotted lines, is a large duct, with an area of six square feet, opening into the shaft, and having a valve for closing it. The room is heated by two hot-air pipes from a furnace, one opening in the floor of the room, the other opening near the ceiling.


PLAN B.

The ventilation was planned to give twenty cubic feet of air per minute to each of the fifty girls, requiring the shaft to exhaust 1.000 cubic feet of air per minute. The registers were placed in the floor at different parts of the room, for the purpose of securing a distributed downward ventilation. The large duct at the top of the room, with its closing-valve, is for changing the ventilation from the bottom to the top of the room when required. There are no means of closing the ducts in the floor. Ordinarily in a cold day the ventilation is wholly from the bottom of the room.

The upper ventilator is opened whenever the temperature of the room rises above 68° to 70° Fah., to draw out the warmest air from the top of the room. The opening of the upper ventilator does not stop the flow of air from the bottom of the room: it di-

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minishes it rather more than one-half; so that the shaft is drawing air from both top and bottom of the room.

In the bottom of the shaft, just above the inlet from the the air-ducts in the floor of the first story, is placed a grate for burning soft coal. A fire lighted in this grate will generally double the flow of air through the air-ducts in the floor. A fire lighted in the morning requires no further attention for the school-day. This grate is only used in the mild soft days of late spring and early fall.

In five years less than one ton of coal has been burned in the shaft for the purpose of forcing the ventilation.

The equation for this shaft becomes

$$V^2 = \frac{64.4 \times 50 \times .00204 \times 2.8 \times (T - T')}{2.8 + 64.4 \times 50 \times .0075}$$

When $(T - T') = 12°$ $V = 2.8$ ft. pr. sec.
" " $15°$ $V = 3.2$ " " "
" " $25°$ $V = 4.1$ " " "
" " $30°$ $V = 4.5$ " " "
" " $40°$ $V = 5.2$ " " "

Here are the results of three observations made under different conditions of temperature and weather. The velocity of the air currents through the different registers in the floor varied from two to four feet per second, according to their location with reference to the shaft.

Nov. 26. — Still, cloudy day.

$T = 72°$. $T' = 60°$. $T - T' = 12°$ Fah.
Observed velocity of air-shaft was . . 2.7 ft. pr. sec.
Calculated velocity as above given . . 2.8 ft. pr. sec.

Dec. 5. — Fresh south-west wind with rain.

$T = 72°$. $T' = 57°$. $(T - T') = 15°$.
Observed velocity of air in shaft . . 3.5 ft. pr. sec.
Calculated velocity . . . . . 3.2 ft. pr. sec.

Dec. 6. — Brisk north-west wind.

$T = 69°$. $T' = 44°$. $(T - T') = 25°$ Fah.
Observed velocity of air in shaft . . 3.9 ft. pr. sec.
Calculated velocity . . . . . 4.1 ft. pr. sec.

With a minimum velocity of 2.5 ft. per second, the shaft will exhaust twelve hundred cubic feet of air per minute, which is more than the required twenty feet per minute for fifty scholars. It renews the air nearly five times an hour. With a less difference of temperature than, say, 12° Fah., it is necessary to force the ventilation by a fire in the shaft.

CORRESPONDENCE.

THE ROMAN CATHOLIC CATHEDRAL.

HARTFORD, CONN.

WITHIN the past few years no inconsiderable amount of building has been done in Hartford by the Roman Catholics. An extensive tract of land fronting on one of the principal avenues in the western part of the city was purchased in 1873 at a cost of $72,000; and in the following year ground was broken upon the western portion for the foundations of the Convent of Mount St. Joseph. This building was duly erected, the expense incurred being about $100,000. It is built of brick with brown-stone finish, and has a main building with wings on either side, three stories in height. The episcopal residence was the next project to which attention was turned; this was built at the eastern extremity of the site, and is similar in character to the convent. It is a comparatively plain structure of brick and Portland stone, erected, like the convent, from the plans of P. C. Keely of Brooklyn, N.Y., whose forte, it must be acknowledged, is the designing of ecclesiastical buildings rather than those which border on domestic architecture.

For some time past Mr. Keely has been preparing drawings for a cathedral to be built by the same parish which has built these buildings, and last spring witnessed the laying of the corner-stone of this large and imposing edifice. The cathedral will be between the convent and the episcopal residence, the lot having a frontage of 400 feet and a depth of 300 feet. The design, which is Early Pointed Gothic in style, is one of Mr. Keely's best efforts, and when completed will add another fine building to the many already built throughout the country by this architect. St. Joseph's Cathedral will be built of rock-face ashlar of Portland stone, with dressed finish of the same material. In plan it will be a Greek cross. The entire length of the edifice will be 264 feet; the nave is 93 feet wide, the transept 178 feet long, and the sanctuary is 59 by 88 feet. The cathedral faces to the south; and the front, which is 123 feet in length, is marked by two towers flanking the main entrance. These will be finished with spires whose apexes are 220 feet from the ground. The main entrance is in the centre of the façade, and leads into a vestibule, which, carried out from the line of the main building, has an elaborately designed arched doorway, the label moulds of the arch springing from the foliated caps which surmount recessed columns; a crocketed gable rises above the tympanum, and is crowned with a carved finial. A similar design marks the other entrances on the front, which are located in the towers. The most characteristic portion of the design of the south façade is the boldly proportioned rose-window, beneath which is a series of square-headed windows, this treatment of small windows being the same as that shown at the same level in the towers, continuous string-courses connecting these portions, and extending the entire length of the front. The apex of the front gable between the two towers will be surmounted by a pedestal composed of clustered dwarf columns with richly-carved capitals, which is to sustain a statue of St. Joseph. The spires of the cathedral will bear much elaborate detail work, — among other features will be small turrets at the several angles; beneath them upon the four faces of the towers are columns in relief supported upon projecting corbels boldly carved. The walls of the nave will be pierced by a series of rich stained-glass windows representing Biblical scenes, while those of the sanctuary will be particularly brilliant. There will be five marble altars, inclusive of the high altar, which will be elaborate in detail. The interior walls of the edifice will be treated with marble; and in the wood-work finish, oak will be extensively used. The floor will be laid in encaustic tiling. The pews throughout will seat two thousand persons. There will be no side galleries. The ceiling will show rich, ribbed oak-work. The basement of the cathedral will be sixteen feet in the clear; and for the support of the floor above and the pillars on that story, there will be fifty-two columns, eighteen of which will be of massive granite. The basement will be entered by doors in the towers on the east and west sides. Beneath the transept of the cathedral will be a chapel having an altar and confessionals, while beneath the sanctuary there will be a high altar, a marriage altar, and a baptistery. In the rear of this high altar a crypt will be built, containing sixteen vaults, to receive the bodies of bishops.

Work upon the cathedral has already progressed so far that the basement will be ready for occupancy by Christmas, the walls having been carried up several feet above the water-table. Over the whole structure a temporary roof has been placed. Next season work will be resumed, and prosecuted as rapidly as the funds of the parish warrant. In the Cathedral of St. Joseph another opportunity is afforded for the semi-erection of church spires, a method of building which will become, it is feared, a by-word in Hartford; but, with the proverbial activity of the denomination which has undertaken the extensive work, it is safe to predict that the required sum will be raised in a few years. A recent effort of the parish, netting some $5,000, is an index to the feeling of the parties concerned; and, although the $300,000 needed to complete the work seems formidable, still there is a keen interest in the undertaking which is far from lessening, and will be kept up until the edifice is ready for dedication.

The latest work in the architectural, or more strictly speaking perhaps, the building world, — for there is not an overwhelming amount of architecture in the structure, — is a city schoolhouse to be built in the south school district. The building of this schoolhouse has been under discussion for a year or more. Local architects sent in designs and plans, which showed the result of study and adaptation to the wants of the district; and the chances of success in a competition called in drawings from parties beyond the city. But as in the case of our Capitol a certain degree of tradition attaches itself to a dome, so in the matter of the schoolhouse, in the minds of certain citizens there is a deep-rooted conviction that a schoolhouse is not a schoolhouse unless of a particular style; which is characterized mainly by elevation, and stairs upon stairs, to the distress of the thousands of feet which have to climb them daily. The result is, simply, that the contract has been awarded for an ordinary building after the stereotyped plan, devoid of any effective treatment, save the introduction of some lighter brick to relieve the dull monotony of red walls and the sameness of the façades. The building is not, we presume, a fair example of the ability of the architect, Jacob Bachmyer, as his field of labor was hedged in by the opinions of that autocrat of architecture, the chairman of a school-district building-committee.

The new addition to the Hartford high-school, mentioned in a former letter, has called down the wrath of the acting school visitor, by reason of its external appearance, which in many respects is not in keeping with the main building. The internal arrangements of the addition are good, and will afford all desired accommodation for many years to come, but the lack of harmony in the exterior is marked. The high school was built in 1869, from plans by G. H. Gilbert of this city; and in some respects reminds one of Phillips Academy at Andover, Mass. The additions are by George Keller, who has better examples of his work in Hartford, among which can be mentioned a private residence now in process of erection in the western part of the city. This house is of brick (laid in red mortar) and Ohio stone, upon foundations of rock-face ashlar. It is marked on its front elevation by a projecting bay, carried up through two stories, which has its front wall pierced by triple windows with square transom lights; and the same treatment is shown in the windows of the hall, except that the latter have stone columns in place of brick mullions. Terra-cotta panels are introduced with striking effect beneath the windows of the front bay, but its use elsewhere throughout the building is not as effective. The lines of the house are diversified, and variety is given by broad piazzas, the disposition of windows showing some regard to the importance of grouping. Moulded courses of stone and a cornice of moulded brick are introduced; and the carved finials upon the dormers are by far the best parts of those important features. The roofs have a high pitch, and are slated

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in two colors; their general lines being broken by prominent chimneys, which make a show of moulded brick, and are crowned with stone caps. The hall has a corner fireplace, so planned that its flues, together with those of the parlor and dining-room, are gathered into one large central chimney. A broad staircase, with square landings, is a prominent feature of the main hall; and for the second landing a door leads to the second floor of the large L in the rear of the house. CHETWOOD.

THE LACK OF THE ANTIQUARIAN SPIRIT AMONG US. — CAN ARCHITECTS COLLECT THEIR DUES UNDER THE MECHANICS' LIEN LAW?

NEW YORK.

THE New York Chapter had a very interesting meeting on the 18th inst. Mr. Charles F. McKim spoke of the work of the London *Sketch Book*, and the manner in which it was supported, and in turn had aided in bringing the best works of the best artists to the front. Its origin, he thought, and its support in great measure, came from a class of men of whom we in this country know but few living specimens, — antiquarian architects, — men who are familiar with the history of building, who are sufficiently versed in the principles of design to describe and note whatever they may meet, and who have leisure enough to enable them to carry on their researches. England abounds with opportunities for the exercise of such a combination of talent. In her cathedrals and cottages, in every class and grade of buildings, mediæval and modern, she is so rich, so abundantly provided, that the materials are found lying in the very footsteps of the architectural critic and observer. This body of men has done good service in what might be called the prevention of cruelty to buildings; and many a fine detail, many a noble work, has been saved from the hands of ignorance or slaughter by these lovers of the arts of construction. In this country there are no such general opportunities. The West is virtually, beyond the modern growth, without any but pre-historic examples of building. In the East and South, the country has been settled long enough to afford a field of profitable research to the antiquarian architect. The New England towns and villages are dotted with colonial structures which would well repay a most careful observation. About Philadelphia another rich field is opened; and farther to the south, as far as Virginia, the old planters' houses, and occasionally churches, might be saved from the oblivion surrounding them, and by accurately measured drawings and notes of the technique of their construction would offer profitable lessons to the architects of to-day. In many instances, more numerous than one who has not studied the subject even partially would suppose, the interiors offer treasures of which the exteriors give no sign. The London Club make a feature of excursions to sections where it is either known that old buildings exist, or where it is supposed they may be found. Many unexpected placers of rich architectural ore are thus opened. The trips are profitable, pleasant, and peculiarly interesting to the architects and their friends taking part. Shall we too do these things here? If it is to be done, the architects must lead the way, must in fact take the light burden upon their shoulders. When abroad in company with the English architects, the speaker had been surprised to find how well posted they were as to many historic or semi-historic buildings of whose histories he was partially ignorant, and to which many architects never give the slightest thought. Sketches and accounts of these would be gladly published in the London *Sketch Book;* but while we have here an architectural journal of acknowledged merit, it was, in the opinion of Mr. McKim, the duty of every one to uphold the effort which was being made by the *American Architect and Building News* to give American architecture a fitting mouthpiece. Through its pages these antiquarian researches into American history as illustrated by our buildings could be given to the world, and from it the architects of to-day could improve their practice by a study of those admirable touches of real art and honest workmanship which the colonial houses afford. A committee to be known as the Antiquarian Committee was appointed to define a course of action, and to collect information which might enable members profitably to follow up the line of investigation proposed in the paper.

The next topic taken up by the Chapter was in relation to architects' liens, or rather the necessity of some such privilege of ready collection of dues on the part of practising architects. The subject was brought up by a request from Mr. Welsh, formerly a member of the Institute, that the Chapter take action in pushing action the case of a brother architect of Brooklyn, who had brought under the mechanics' lien law, had been defeated, and had now an opportunity of carrying the matter before the Court of Appeals of the State; and there secure a final opinion on the general question of whether an architect performing the full duties of superintendent can recover under the lien law as now on the statute-book. Decisions were diverse: there were cases where such recoveries had been made, but they were under special circumstances; and the want of an intelligible decision on the point involved was felt by all. Mr. Welsh urged that the Chapter take up this case as a test one, and secure an opinion which might be of service hereafter. The matter was fully discussed, some being opposed to the concession on the part of architects which would place them on a par with mechanics. Others thought that a ready means of collection would be desirable at any cost, and that architects would lose nothing by coming under the general law. It was resolved, however, not to take up the case offered by Mr. Welsh as a test one, on the ground that the Chapter had not the funds to devote to such uses; but it is likely that some other effort will be made by the Chapter to bring about a favorable change in the law as it now stands. W.

THE EFFECT OF LOWERING THE GROUND-WATER OF THE BACK BAY LAND, BOSTON.

THE Boston Society of Architects have addressed to the government of that city the following petition in view of the possible effect of the new sewerage system upon the stability of a large portion of the most costly dwelling-houses in the city: —

BOSTON SOCIETY OF ARCHITECTS.

SECRETARY'S OFFICE, PEMBERTON SQ., BOSTON, Dec. 26, 1877.

TO THE MAYOR AND ALDERMEN OF THE CITY OF BOSTON.

The Boston Society of Architects respectfully represent to your honorable body that the commissioners on the sewage of the city, appointed under your orders of Feb. 23 and March 1, 1875, in their report (City Doc. No. 3, 1076) take occasion in several places to state that the system which they recommend, and which we understand has been accepted, and is now partly under contract, will lower the ground-water on the Back Bay territory about two feet (see pp. 25 and 40).

We beg leave to enclose herewith, for your further information, a copy of a letter from E. S. Chesbrough, Esq., C. E., chairman of said commission, dated Dec. 4, 1877, in reply to a letter of inquiry addressed to him by order of the executive committee of the society.

As most of the foundation piling on the Back Bay territory has been cut off at various grades above the grade 5, and some as high as 7½ or 8, and as the commissioners expect to lower the ground-water, at least over a part of this territory, as low as grade 5, the head of much of such piling must remain unprotected by the water if these expectations are fulfilled, and there must follow in the course of a few years serious and extensive dilapidations in the buildings erected in that district.

As citizens, therefore, the members of this society respectfully represent to your honorable body the urgent necessity of obtaining accurate information as to the grades of the ground-water in various parts of this territory, and the probable effect upon them of the establishment of the new system of sewerage; and, if necessary, to require such modifications and safeguards in the plans proposed, and now in process of execution, as shall secure private property from the serious damage which, it would seem, may reasonably be anticipated from this cause.

Respectfully submitted.

(Signed) E. C. CABOT, *President.*

HENRY VAN BRUNT, *Secretary.*

THE NEW SEWAGE SYSTEM OF BOSTON.

TO THE EDITOR OF THE AMERICAN ARCHITECT AND BUILDING NEWS.

THERE is but a small portion of our citizens who are aware of what is proposed in the way of improving our entire sewage system; and also its immense cost. The questions that will be asked are, *Will* this great outlay make our sewage system perfect? shall we have no smells entering our houses through the sewer-traps? and will this system (in some parts of the city actually commenced) entirely prevent sewer-gases from escaping through street openings and conductors? Now, in answer, it is safe to say as to the disposal of the sewage matters, solid and liquid, it will dispose of them perhaps, if permitted to flow into our harbor from the Moonhead Reservoirs, when both tide and wind are running and blowing off shore. But there has been no provision made for the removal of the sewer-gas. The sewers, as is well known, are the general receptacles of nearly all the filth of the city, and are therefore always generating noxious and deadly gases. If we but think for a moment of what they are always receiving, we shall be surprised that our citizens have escaped diseases as they have thus far. The water that has been used in the sick-rooms flows into the sewers; and also the water used in cleansing clothing from both small-pox and other contagiously diseased patients. Physicians have at times been at a loss to account for the presence of diseases that suddenly made their appearance in cities. May it not be from the sewer-gases generated in the sewers? In a London scientific journal it was recently suggested to build tall chimneys for the sole purpose of ventilating the sewers, and thus allow the gases to pass into the air at a height above the dwellings. This is considered better than no ventilation; but the best and surest way to dispose of these deadly gases is to exhaust them from the main sewers by means of powerful exhaust fans, and blow them over fires, and thus disinfect them; they will then pass into the air as harmless as smoke from a kitchen fire. If the exhaust fans are large enough there will be a partial vacuum formed in the sewers, and in place of sewer-gas escaping from the conductors to the air, we shall have air entering through those channels to the sewers and also from every street opening. The new sewage system of this city will provide several large main and intercepting sewers. These all will be so many sewer-gas generators, and if ventilated they will only diffuse the sewer-gases over the city. I consider the only proper way to deal with these gases is to disinfect them by blowing them over fires; and as they are to a great degree inflammable, the heat could be utilized in generating steam to drive the engines which furnish power to drive the fans; and if any excess of steam can thus be generated, it could be used in

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warming public buildings or schools. Hoping this matter will receive the attention of our public men,

I am yours respectfully, C. W. B.

NOTES AND CLIPPINGS.

A PANIC IN A COTTON-MILL. — On Saturday, Dec. 22, the cotton waste in the drying-room of the cotton-mill of C. J. Milne on Lombard Street, Philadelphia, caught fire, and caused a terrible panic among the two hundred operatives in the building, for the fire was at the foot of the stairs. We presume that there was more than one staircase in the building, although it is said that there were no fire-escapes whatever. The fire was confined to the drying-room, and the panic resulted in no fatal injuries to the operatives.

THE NEW YORK NATURAL HISTORY MUSEUM. — The new building of the American Museum of Natural History, which was so lately dedicated in Central Park, is only one-twelfth of the whole building (see the plan in our number for Aug. 12, 1876), which is to occupy a plat of some eighteen acres. The original charter of the Museum provided that it should not hold real estate valued at more than $100,000; but by means of memorials, appropriations amounting to $700,000 were obtained as building funds, and all of this has been spent on the portion just finished. The building, of which Messrs. Vaux and Radford are the architects, is built of brick and granite. It is 199 feet in length and 66 feet in width, and is practically five stories in height, one of the stories being the gallery of the main hall. The wood-work of the interior is of black walnut and ash. The floors are of brick arches, covered with concrete, and laid with English tiles. The staircases are of iron, and the treads have gutta-percha coverings. The building is thought to be absolutely fire-proof.

THE SURVEY OF NEW YORK STATE. — The survey of New York State, of which we have from time to time made mention, has made admirable progress. During the past season, the lines of Albany, Rensselaer, Saratoga, Schenectady, Schoharie, Otsego, Montgomery, Fulton, Herkimer, and Oneida Counties have been accurately determined and partly marked by permanent boundary-marks. The length of these lines is about 175 miles.

WORK OF THE HEALTH DEPARTMENT. — An inspector employed by the Board of Health has during the past season done a significant amount of work in the use of disinfectants in parts of the city of Boston where diseases were liable to arise. The total number of places disinfected was 14,407; and in so doing 130 barrels of copperas, 26 casks of chloride of lime, 10 barrels of carbonate of lime, and three barrels of disinfecting powder, were used.

NOTICE TO ARCHITECTS. — The futility of public competitions cannot perhaps be better shown than by the following invitation addressed in good faith by a building committee in one of the South-western States to architects. To those who are disposed to do work for which they *may* get $100 instead of the $1,050 which would regularly be their due, we will if desired give further information.

"The County Court for —— County have determined to erect a new Court House in ——, at an early day. As a committee of the Court, we hereby solicit plans and specifications, including drawings and detail work, with full and reliable estimates of itemized costs. Drawings, etc., to be furnished the undersigned at ——, on or before the first Saturday in February, 1878. It has been decided to build a house that will not cost more than $30,000, and the plans and specifications should be for a building which will not exceed that sum. The County Court will pay $100 for the plan it may adopt, but it reserves the right to reject all plans that may be presented."

THE MAINE GENEBAL HOSPITAL. — It is shown that it costs $200 per patient to heat the Maine General Hospital, and an investigation is going on to see if this be really necessary.

INDIAN MOUNDS. — Upon opening two Indian mounds on the banks of Lake Monona, near Madison, Wis., two skeletons were found, together with some pieces of pottery and flint arrow-heads. The skeletons were found in a kneeling posture facing the north-east, and were some five feet under ground. The trees growing over the mounds are probably two hundred years old. These are the first skeletons found in mounds around this city, although a number have previously been opened.

THE INTER-OCEANIC CANAL. — There seems to be a strong probability that the French or other foreigners may obtain from the Nicaraguan government the exclusive right of building the inter-oceanic canal. This would be peculiarly aggravating, because it was only a single clause which was objected to by the representative of Nicaragua that prevented Mr. Fish from presenting for the approval of the Senate a treaty which would have secured to us the much-to-be-desired privilege of initiating the undertaking.

IMPROVING INTERIOR NAVIGATION. — During the past nine years two boats have been employed pulling snags and dredging on the upper Mississippi, and have removed 2,972 snags and 13,937 leaning trees. On the Minnesota River improvement 5,362 leaning trees have been cut, 5,485 snags pulled up, and 2,549 cubic yards of bowlders removed.

DISCOVERY OF A PRACTICABLE ROUTE TO THE NORTH POLE. — Capt. Wiggins, an Englishman lately arrived at London from the Jenisei and Obi Rivers, in Siberia, reports that a route is practicable to the North Pole with an open sea all the way. Capt. Wiggins sailed from the capital of Siberia to St. Petersburg, in a schooner of forty tons.

THE ENGLISH CHANNEL TUNNEL. — The excavation which has been making for some time at Sangatte has reached a depth of more than three hundred feet below low-water level, and the experimental horizontal gallery is already under way. If during the excavation of this gallery, which is to be only one kilometer (three-fifths of a mile) in length, no insurmountable difficulties are met, work on the real tunnel will be begun forthwith. Two large pumps are necessary to keep the water in check.

THE LIVERPOOL WATER-SUPPLY. — It is said that Liverpool has decided to get its water from Wales; an undertaking which will cost more than six millions of dollars.

SOUTHWELL MINSTER. — There are rumors that the Chapter of Southwell Minster have determined on very extensive restorations. It is proposed in the first place to re-roof the whole building; to build two spires on the fine Roman towers now standing; to remove the choir-screen, modelled by Bernasconi, and substitute an iron grill of modern make and style, and to make the building much better than new. Of course the scheme is meeting with much opposition from the anti-restorers.

A NEW FRENCH CANAL. — About sixty miles below Rouen a maritime canal is probably to be built, starting from Tancarville, passing by Harfleur, and having its lower end at Le Havre, thus doing away with the dangers of navigation in the lower part of the Seine. It will be about eighty feet wide and about twelve feet deep, and the Seine as far as Paris will be dredged out to the same depth. The cost of this improvement will be more than six millions of dollars.

THE ELECTRIC LIGHT IN BERLIN. — The first experiment with the electric light in Berlin was made on the 14th of November, in the new synagogue in the Oranienburg street, before a large crowd of people. In the court-yard of the building a stationary apparatus furnished the light, which was conducted over the roof into two of the five round windows, whence the light streamed down on the synagogue below. The effect was astonishing. The light was so brilliant that it illuminated the gallery and the remotest corners of the edifice. The splendor of the light was vivid, but not offensive to the sight. In comparison with gas, the result is as follows: gas, per hour, fifteen dollars; the electric light, one dollar for the same time. The apparatus costs several thousand marks. The synagogue was also lit up outside by the electric light, bringing it out as bright as day, and producing a most magical effect. Gas burned alongside of the electric light looked pale, and was, as it were, thrown into the shade. — *Philadelphia Press.*

CLOCKS IN THE SOUTH OF FRANCE. — The clocks in the Basque Provinces of France are made to strike twice; first to give warning, and then to denote the hour. Few of the people can read the time, and frequently no minute-hand is used.

VENETIAN SEWERAGE. — The square of St. Mark, in Venice, is often flooded by the spring tides. Engineer Domenico Asti proposes to remove the inconvenience by conduits which will hold the greatest quantity of rain that ever falls in six hours, with self-acting gates, which open at low tide, and exclude the waters of the lagoon at high tides. By an expenditure of $20,000, he thinks that all inundations can be prevented.

AN ITALIAN EXHIBITION. — An international exhibition is to be held at Milan, Italy, in 1879.

FIRE AND SMOKE ESCAPES. — Messrs. Sues and Karl's smoke and fire escape consists of a fire-proof ceiling under the roof of the stage, with outlet shafts proportioned to the cubic contents of the stage and auditorium, and high enough to reach above the nearest buildings. In case of fire a valve is opened, and the fire is forced up to the upper air by the current from the auditorium and the stage. The stage is lined with sheet-iron, and has an additional iron ceiling supported by strong rods from the roof, and a funnel in the centre eight feet in diameter, which rises twenty-eight feet above the building. In case of fire, the sliding-valve connected with the funnel can be opened by pulling the handles which are found throughout the house, or by the mere opening of the door, and all the smoke and fire are sucked up through the cylinder. At a test made Dec. 6, at Hooley's Theatre in Chicago, powder, sawdust, and other things that could make a smoke were burned. The house was filled with smoke, but on opening the valve, it disappeared in a minute. Fire Marshal Benner wanted a test with the curtain down, and it was performed with the same satisfactory results. The curtain was rolled up, and not a smell of smoke was left after one minute.

PRINTING IN COLORS. — A report comes from Munich, Bavaria, that colored pictures have been produced by a new photographic process. Three photographs are taken. The first is on a plate which is sensitive to yellow rays only; the negative of this is printed by photo-lithography in yellow ink. The second photograph is from a plate only sensitive to blue rays, and the printing from this is with blue ink, overlaying the first printing. The third photograph is of red, and the printing is done with red ink. The colors thus blended in printing are said to give the natural tints, though of this we should require ocular proof before believing so broad a statement.

THE FRENCH RAILROADS. — The official returns published by the Ministry of Public Works show that at the beginning of the present year the total length of railways open in France was 12,715 miles, in addition to which there are 3,757 miles in course of construction, or for which a concession has been granted. This total does not comprise 2,887 miles of local railways, and 109 miles of line belonging to mining and other companies.

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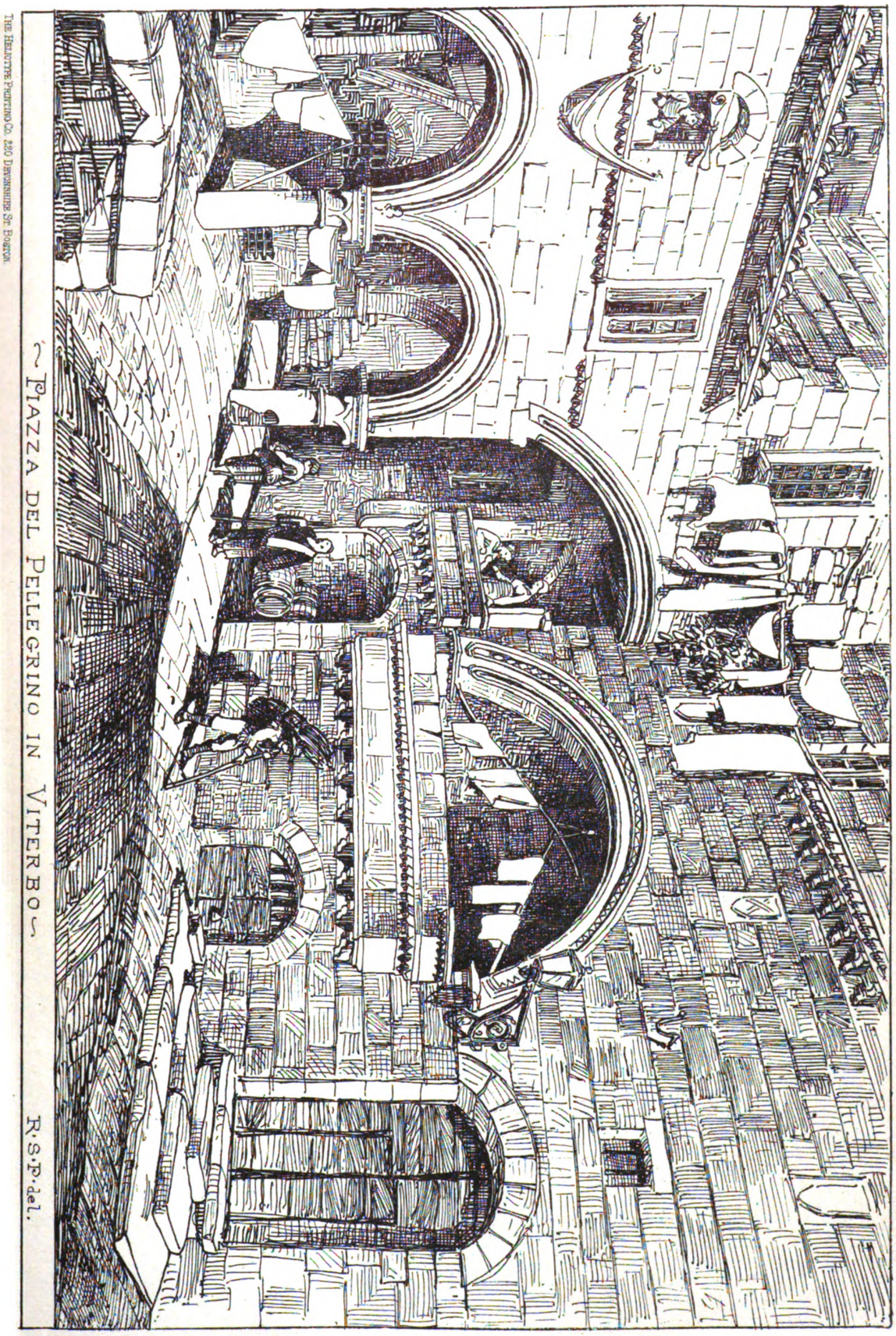

~PIAZZA DEL PELLEGRINO IN VITERBO~

R.S.P. del.

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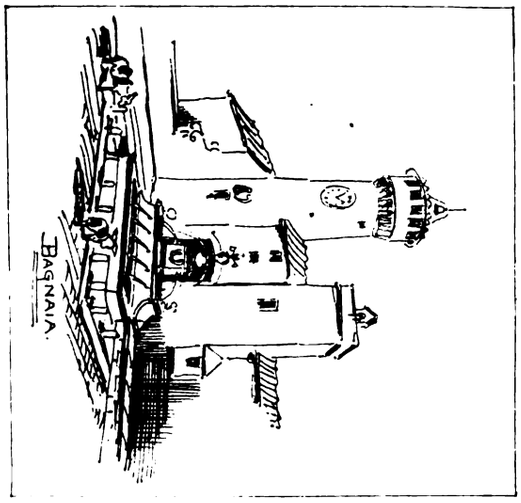

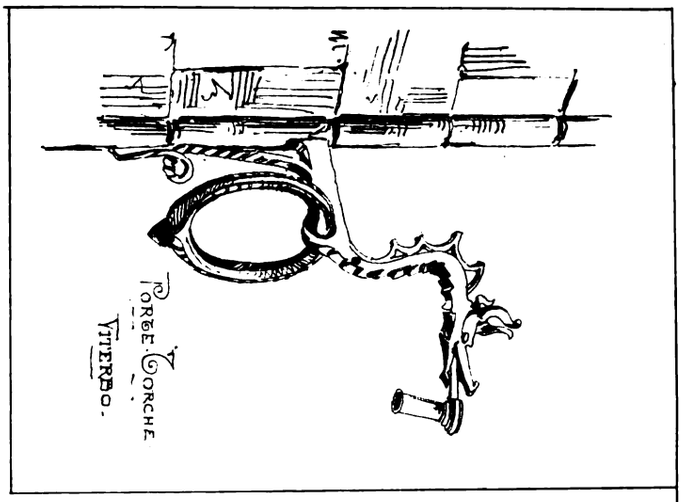

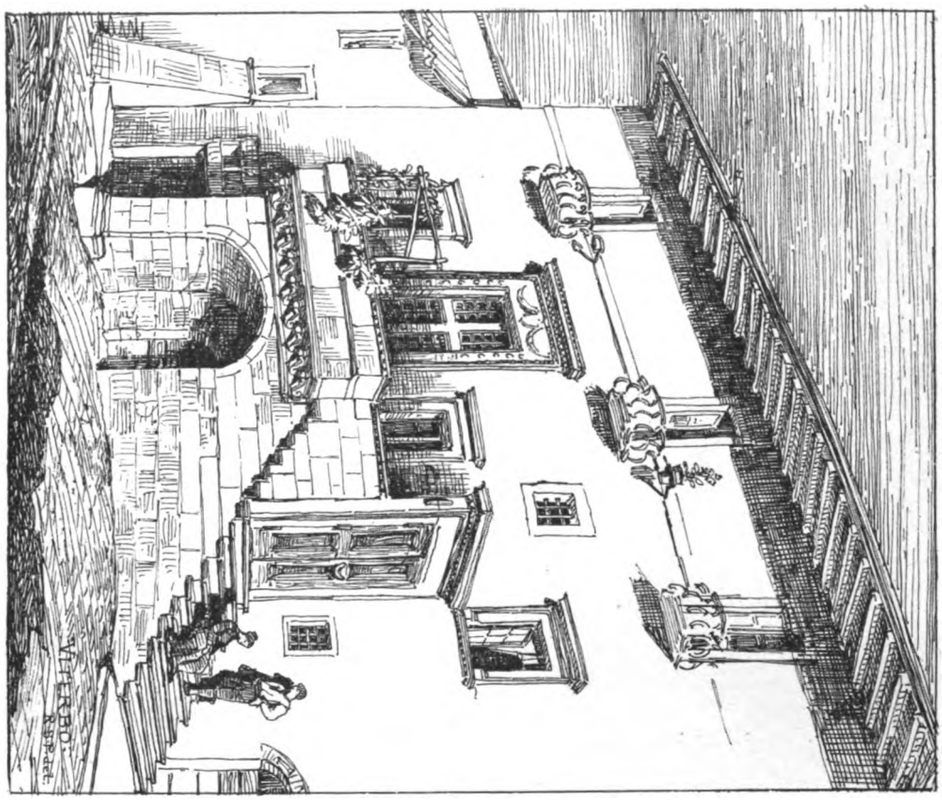

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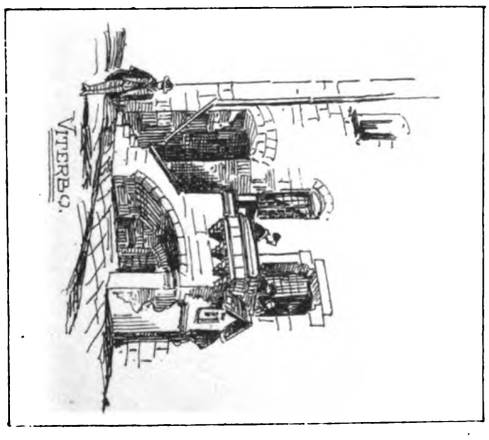

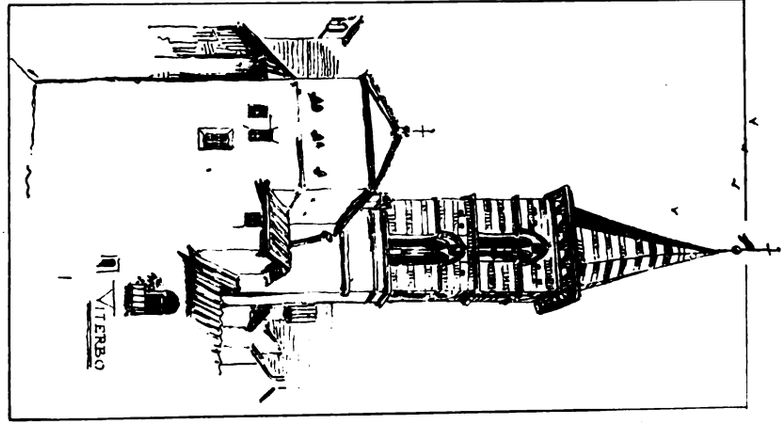

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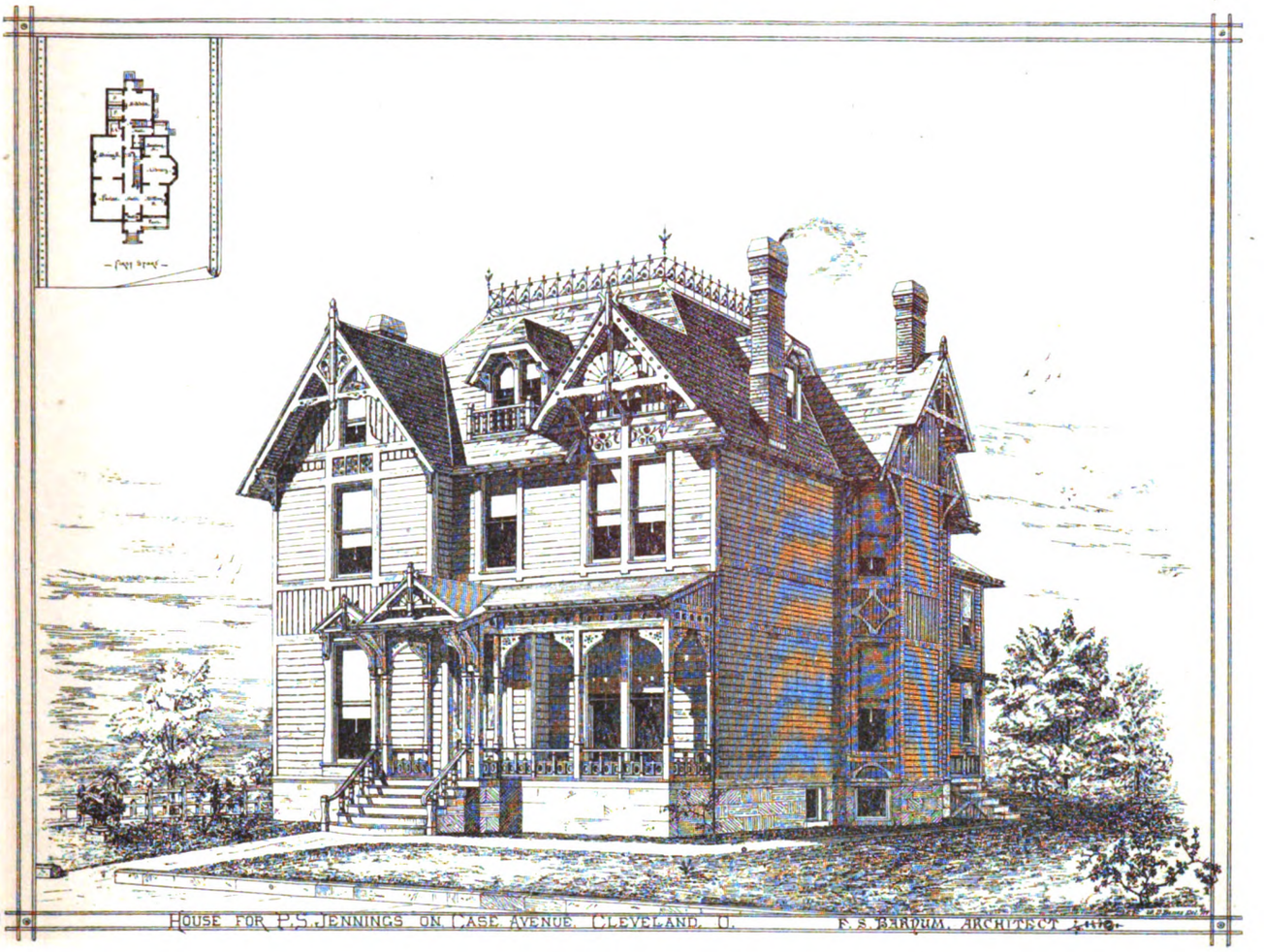

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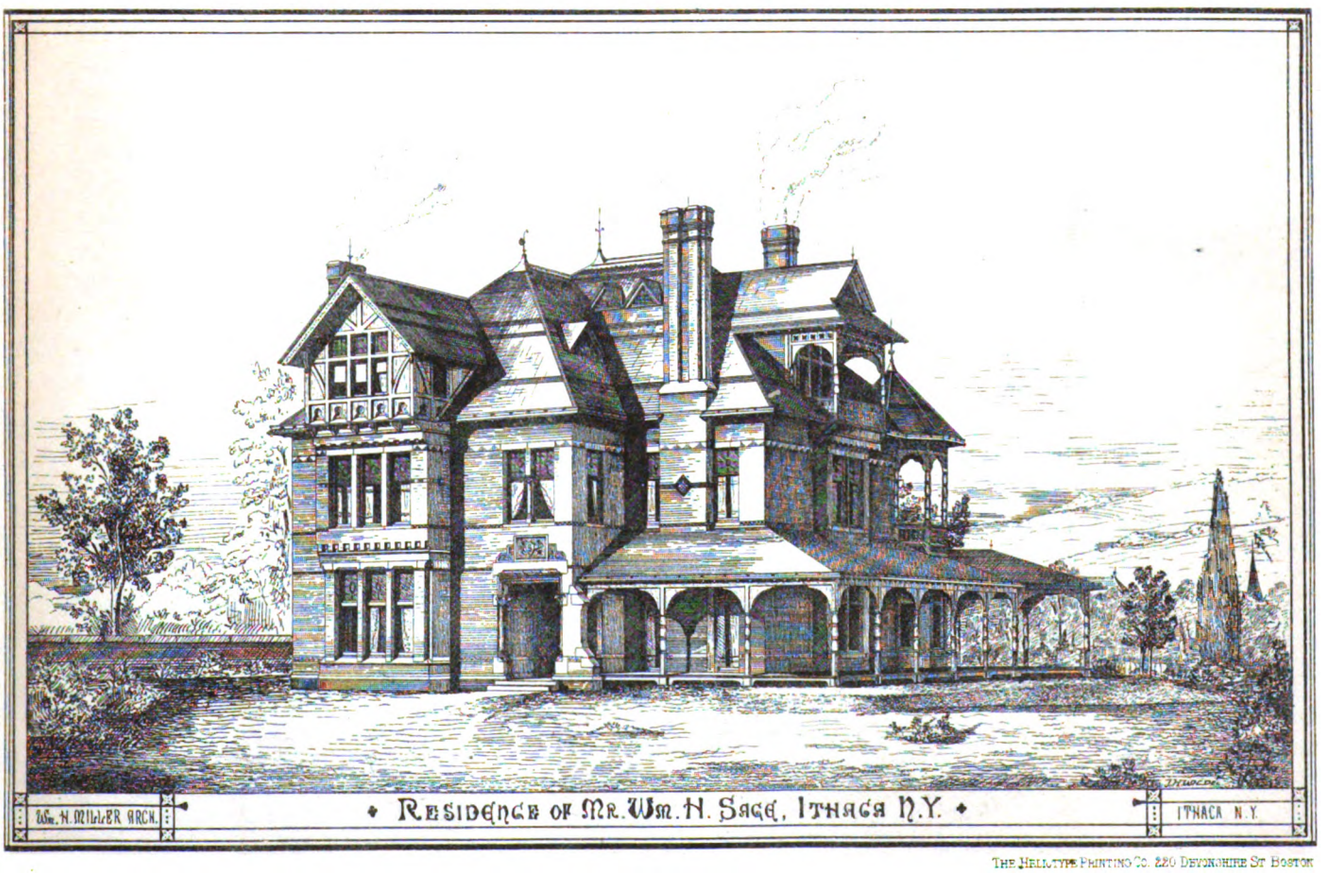

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

(SUPPLEMENT.)

TENTH ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS, HELD AT PHILADELPHIA, PENN., OCT. 11, 1876.

PAPER ON THE ARCHITECTURAL EXHIBIT OF THE CENTENNIAL EXHIBITION.

BY R. M. HUNT, FELLOW.

MR. PRESIDENT AND GENTLEMEN OF THE INSTITUTE, — I propose to call your attention to a brief review of the architectural exhibit of the Centennial Exhibition, — a most appropriate subject for discussion during our Convention of 1876.

I beg, therefore, to ask your consideration, first, of some of the effects occasioned by the great architectural revival since 1851, the natural outgrowth of the first World's Fair, and the succeeding ones of London, Paris, and Vienna.

One of the most useful and practical benefits of these great International Exhibitions is the familiar manner in which the industrial arts have been presented to the general public, as well as to the specialist; and which has been of the greatest possible service in educating and cultivating laymen, as well as instructing professional students.

And what has so told upon the individual mind has in a larger way influenced municipalities and corporations; resulting in the greater attention paid to sanitary science of late years; the elaborate and thorough systems of sewerage and drainage; the lighting of our houses and streets with gas; telegraphic communication and rapid transit; the introduction of healthful and plentiful supplies of water and air into the midst of centres of population; to all of which little or no thought was given formerly, but which now are deemed of paramount importance in the construction of our modern cities.

In the various capital cities of Europe, the narrow, tortuous, dismal streets of the middle ages, which existed almost intact until a quarter of a century ago, have made way for broad and noble thoroughfares in harmony with the requirements of the day: edifices are erected after the *new*, not the *old;* and the spirit of improvement which the conventionalist and the antiquarian call the "curse of the age" tears down the damp old walls, and air and sunlight now pour in where disease and crime once held high festival. The cry was loud in Paris, when Baron Haussmann, under Napoleon III., opened his boulevards right and left, giving breathing space to its population of millions; and many a traveller to-day sighs in Rome over the strong-limbed Piedmontese who is laying the sewers and drains under the new *régime*, to drive away the very fever which might send the same traveller home, shorn of his strength, a sadder and a wiser man. He sighs because the lazy, dirty, charmingly picturesque Roman peasant is being pushed out of sight.

It cannot be denied that some quaint and picturesque nooks and corners have disappeared, nor that certain historical landmarks have been obliterated; but, as a general rule, monuments of historical interest or artistic value have been preserved and repaired, even reconstructed, particularly in France, and under the empire, which restored with great minuteness of detail châteaux and churches fast crumbling away under the heavy foot of time. Even in our new country, where so much remains to be accomplished, many systematically find fault with this so-called "mania for modern improvement," which must grow out of the wants and requirements of modern civilization, and with us, in a peculiar degree, out of the rapid growth of large cities and manufacturing towns, where cause and effect follow each other with a rapidity unknown in the Old World.

We, as a body, have accomplished much in this direction; and yet it is a fact hardly to be denied, that our profession does not hold in this country the elevated position it has always held in Europe. Our task is, however, a peculiarly difficult one; for it is no easy matter in a new country to enlist the sympathies of the general public beyond the securing of the more material results; and not until art-education has become more general can we hope for that sympathy and appreciation which is born of knowledge.

But already there is a promise of better things. A few technological and industrial-art schools are in successful operation, and the first steps have been taken toward the art-education of the masses; while, in this Centennial year, we have just cause to congratulate ourselves upon the establishment of Art Museums, similar to that of the South Kensington in London, in several of our larger cities; and we may reasonably hope that our Exhibition will stimulate and improve all our art-industries, as the first World's Fair improved those of Great Britain.

Having thus alluded to some of the important bearings which international exhibitions have on modern progress, before considering the architectural exhibits contained in the various buildings, a few words about the locality and the buildings themselves might not be amiss.

The Exhibition grounds, in Fairmount Park, which possess the most striking natural advantages, comprise about two hundred and forty acres, and are on an elevated plateau, traversed by two small streams flowing into the Schuylkill River. This admirably adapted site, well wooded and picturesque, has rather the form of an irregular equilateral triangle, the south side of which is occupied by the Main Building and Machinery Hall; while Memorial Hall and Horticultural and Agricultural Halls are on the north-east side, with the Woman's Pavilion, United States Government Building, and most of the States' buildings, grouped toward the north-west. Interspersed among these are about two hundred structures, comprising foreign commissioners' buildings, those for the special exhibits, cafés, restaurants, bazaars, etc. The grounds are tastefully laid out as a landscape garden, with asphalted roads and walks following the natural contour of the land. A few broad, straight avenues, furnishing a more direct communication between the most important points, are wisely introduced, and form a grand and noble feature; while, on account of the vast extent of the premises, and the great distance between the buildings, a novel feature — that of a passenger-railway, running in close proximity to the principal buildings — has been introduced. The Exhibition buildings, with few exceptions, are well adapted to their various purposes, and are appropriate in design, and neatly executed. It is to be regretted, however, that more attention was not paid to the various structures erected by the different States and by special exhibiters. With the exception

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of a few typical structures, mostly erected by foreign nations, little can be said in commendation; in fact, the great majority are beneath criticism, architecturally considered; whereas a proper attention to this important subject would have much added to the exterior beauty of the Exhibition.

Without entering into minute details of the various buildings of the Exhibition, a few general remarks may not here be inappropriate.

The Main Exhibition Building is parallelogram in form, and covers an area of more than twenty acres. It is 1,880 feet long, 464 feet wide, and 70 feet high, and was erected in about eighteen months, at a cost of $1,580,000. The principal nave, 120 feet wide, extends between the galleries located at either end, and is accompanied by two others, each 100 feet in width, with intervening and outside aisles, respectively 48 and 24 feet wide. Similar naves with intervening aisles cross the building in the middle. Iron columns placed 24 feet apart — lengthwise of the building — support the wrought-iron trusses of the roof, which is covered with tin. The flooring is of plank, laid on sleepers resting directly on the ground, with no open space beneath, — a precaution against fire; a complete system of water supply and drainage being also provided for protection against such a contingency, and for sanitary purposes. The sides of the building are filled in between the columns with brick-work to the height of seven feet, with glazed sash above, a portion of which is movable for ventilation. Louvre ventilators are also introduced over the main naves, together with skylights.

The general effect of the building is satisfactory, considering its temporary character, and the consequent imposed restriction as to cost, and also in view of the materials used, — glass and iron. It should be here stated that the columns and trusses are so designed as to enable them to be taken down and used elsewhere. As might be expected, there is a total absence of any thing like monumental grandeur, or even apparent substantiality, about the building. A certain stiffness and stringy monotony pervade the whole structure; while the relative height, as compared to the vast area covered, produces a squatty appearance.

The façades, with their central features and corner towers, connected by lower galleries in front of the main walls, are somewhat relieved of their monotony by pleasing effects of light and shade.

The central portion, carried up with its towers, forms an appropriate crowning to the general mass.

The interior is light and pleasing, but wanting in effect and variety. The spectator, taking in as he does at a glance the entire space, fails to appreciate the extent and vastness of the *ensemble*.

The ground-plan of the Paris Exhibition of 1867 — with its concentric oval naves and radiating aisles, presenting an ever-changing variety — was far more satisfactory in this respect, besides being better adapted for the classification of the various exhibits, either in groups, or as national exhibits. The abandonment of any similar plan is to be attributed to the great loss necessarily sustained; as the mass of the materials, when taken down, can be put to no practical use.

Machinery Hall, also a parallelogram in form, is 1,402 feet long and 360 feet wide, and covers an area of about fourteen acres. It was erected in nine months, at a cost of $542,300. Two main avenues, 90 feet wide, 70 feet high, and 1,360 feet long (the distance between the galleries occupying the ends of the building), are accompanied by one intervening and two side aisles, each 60 feet wide, and 40 feet high. A transept 90 feet wide crosses in the middle of the building, and extends beyond the main hall on the south side. This is flanked by aisles 60 feet wide, and forms an annex for hydraulic machinery. On account of the great similarity in plan between this and the main building, the effect produced is much the same: the interior of Machinery Hall, however, appears more substantial, due in part to the use of wood in its construction; whilst great praise is due to the admirable arrangement of the hydraulic annex which forms so marked a feature.

Agricultural Hall was erected in about eight months, at a cost of $260,000; and is 820 feet long, 540 feet wide, and covers an area of over ten acres.

The main nave is crossed at intervals and at right angles by three similar ones, all constructed of Howe truss arches of Gothic form. The spaces between these naves, and the spaces which occur at the four corners of the building also, form, as it were, so many covered courts. The disposition of this building is well adapted to its purposes; and it owes much of the effectiveness of its interior to its grand arches springing directly from the ground, — a very satisfactory feature, contrasting favorably with the stilted and rather unstable appearance of the perpendicular supports employed in the two buildings just alluded to.

The United States Government Building (with its naves and aisles) in the form of a Latin cross, and the Women's Pavilion in the form of a Greek cross (with accompanying corner courts at the angles), respectively cover an area of 102,840 square feet and 26,368 square feet. These constructions are of wood, and are effective in their appearance, both externally and internally. This is particularly due to their disposition in ground-plan, which represents types so familiar to us all.

Among the minor temporary structures worthy of passing notice are a United States Post Hospital, and an Ordnance Laboratory Building. This latter structure consists of a wrought-iron frame, riveted together, and covered with a light wood casing. In the event of an explosion, only the roof and sides would be carried away; while the frame would stand, to protect inmates against injury from falling materials.

A peculiar feature to be observed in the Art Annex Building is the communication between the numerous rooms which is provided for in the angles. Good hanging space is thus gained, but at the expense of considerable perplexity to the visitor.

The State Buildings of Ohio, New Jersey, Massachusetts, and Connecticut, are to be commended; the two latter being in the style of the old Colonial homes of New England, the former representing types of our modern country-houses. In the Ohio Building, a great variety of the building materials of that State are cleverly introduced.

The New York State Building is truly remarkable from quite another point of view, and may be intended as a representation of the *New American Style* or *Order of Architecture*, based on *hexagonal principles*, models of which form a curious exhibit in the Agriculturall Hall!

A marked contrast exists between most of these State structures and those of England, Germany, Sweden, France, and Japan, all of which are very praiseworthy, and typical in design and execution.

A few words, in conclusion, about those of the exhibition buildings which are destined to remain, — Memorial and Agricultural Halls. The latter, constructed in the Moorish style, is appropriately located on a terrace. On either side of a central conservatory, 230 by 80 feet, and 55 feet high, are the forcing-houses. The ends of the building are devoted to reception and dining-rooms, offices, &c. Four principal entrance vestibules occupy the middle of the four sides: from these, stairs lead to the interior and exterior galleries above. In the basement, which is fire-proof, are the kitchens, storerooms, heating apparatus, etc. This building, with an area for exhibition-purposes of 122,500 square feet, was built in eleven months, at a cost of $300,000. The *ensemble* is satisfactory, especially when viewed at an angle; the curved surface of the glass roofs of the forcing-houses gracefully harmonizing with the middle portion above, which is surmounted by a lantern.

Memorial Hall, also located on a terrace, was erected by the State of Pennsylvania and the City of Philadelphia, and is by far the most pretentious structure on the Exhibition grounds. It is fire-proof, and covers about an acre and a half; it being 365 feet by 200 feet, and is 59 feet high, over a basement 12 feet in height.

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Its cost was $1,500,000, and twenty months were employed in its construction. It is hereafter to be used as an Industrial Art Museum, to be inaugurated at the close of the Exhibition. The principal entrance vestibule, 82 feet by 60 feet, and 53 feet high, opens into a grand central hall 83 feet square and 80 feet high; the square dome above rising exteriorly to the height of 150 feet. On either side of this central hall are located the main galleries, 98 feet long, and of the same width as the hall. These are flanked by cross-galleries at the ends, 89 feet by 28 feet, which extend between the pavilions at the corners. In the rear, the spaces between the corner pavilions and the central entrance are devoted to studios and small exhibition-rooms, with a communicating corridor. These latter rooms, also those in the corner pavilions, are lighted by side-lights: in the remainder of the building sky-lights are used. Open arcades are happily introduced in the principal façade, which extend from either side of the main vestibule to the corner pavilions: these arcades form covered promenades, and at the same time serve as screens to the blank walls of the galleries. The intervening spaces between these arcades and the outer walls of the main galleries are laid out in garden-plats.

At a certain distance the general effect of the masses is rather satisfactory; but upon a nearer approach, the building, which is constructed of granite and in the Renaissance style, loses much; the ornamentation being very commonplace and meagre in design, while in execution it leaves much to be desired. Great defects also exist in the interior distribution, among the most flagrant of which is the poor accommodation of the upper stories of the corner pavilions. Greater simplicity of design and breadth of treatment, with less ornamentation, would undoubtedly have produced a nobler effect, and been more in harmony with the material used, perhaps not the most appropriate. A want of scale also pervades the details throughout: this is specially observable in the main central hall, the dome of which rests clumsily on the walls.

In view of the fine and varied exhibits made in painting and sculpture, and of the numerous and interesting displays in the art-industries, it can hardly be said that their sister art of architecture has been fairly represented at the Centennial Exhibition, whether considered æsthetically or as an art of construction; the designs being few in number and mostly of minor importance. This may be somewhat accounted for by the fact, that architectural designs, and projects of construction, have often necessarily only a local interest; while the technical character of architectural drawings prevents them from being appreciated, or even properly understood, by the general public. To the great number also of architectural publications which have sprung into existence since a few years, containing every thing of interest to the profession, may be attributed the meagreness of the exhibits. For these and other causes, geometrical drawings — of such paramount importance — have gradually been superseded by perspective views; whilst the latter too often have been, as on this occasion, supplanted by photographic views of the finished structures, so that the handiwork of the architect, so far at least as the design is concerned, is wholly ignored.

In consequence, the Exhibition is wanting in much that would render it interesting and instructive, not only to the profession, but to a large class of the public, who would certainly appreciate a thoroughness, both in architectural design and construction, which prevails abroad, and which is wanting with us; due to a more scientific and judicious use of the various building materials, and to the higher standard of taste, which naturally exists in the Old World.

As compared with the exhibits of other nations, one is struck with the ambitious pretension of our designs, overloaded as they too often are with meretricious ornament. Another salient feature is the attempt to produce novelty of effect, often resulting in a want of harmony and repose, so essential to good work. A certain insane desire to carry up some portion of a building to an excessive height was remarked upon by a foreigner, who naively inquired why it was that we Americans did this, and why a *petit bon homme* was so often stuck on the top of our buildings.

Without wishing to particularize, which would detain your kind attention too long, I cannot refrain from alluding to the satisfactory exhibit made by the State of Massachusetts. Complete sets of geometrical drawings accompany the perspective views of the various buildings. Among other projects of merit may be mentioned, as worthy of especial notice, designs for a college, a grammar-school, a hospital, an insane asylum, and an abattoir.

The brilliant display made by Great Britain in the other art departments renders the meagreness of her architectural exhibit all the more striking. The design for the decoration of St. Paul's, London, and that of the new Exchange Building, Liverpool, — the most important exhibits, — are both wanting in simplicity and breadth of treatment. In the former there is a total absence of that repose so desirable, not to say absolutely necessary, to secure that sublime grandeur and dignity which should stamp such work. The latter, in the French Renaissance style, is greatly deficient in originality of design, and in thoroughness of treatment in the general distribution of the masses of the façade, the relative importance of its principal features, and in its ornamentation.

Excepting some designs by Burges and Spiers, — those of the latter decidedly French in treatment, — and one or two other designs, a certain crudeness prevails in the English exhibit. It is but fair to add, that but few of the prominent members of the profession in England have contributed.

This reflection applies with still greater force to the French contribution, where two rejected designs alone are worthy of particular notice: one being a noble and imposing project for the Church of the Sacré Cœur at Montmartre, by Crépinet; and the other a project for the Théâtre de la Renaissance in Paris, by Lalande, which latter is notable for the talent shown in overcoming difficulties occasioned by the restricted and irregular shape of the ground-plot. We must except also the Orléans Railway Station in Paris, by Reynaud, a work of great importance and merit, the design of which was remarkably well rendered; also certain designs and models of light-houses exhibited by the Ministry of Public Works, but which more properly belong to the engineering exhibit.

When we reflect upon the numerous and grand edifices erected by such men as Lefuel, Duc, Garnier, Questel, Millet, Ballu, and upon the thorough and remarkable restorations made by the late Duban and Viollet-le-Duc, we cannot fail to deplore that France was so inadequately represented.

Considering also the grandeur and importance of the architectural work done in Vienna by Schmidt, Hausen, Foerstel, and others, our disappointment is great indeed at seeing their grand achievements only in photography.

Russia exhibits a well-studied design of a cathedral church, not treated, unfortunately, in the Russo-Byzantine style, but rather in the Lombard, so prevalent on the borders of the Rhine.

Belgium's only exhibit is also a design for a cathedral in the Gothic style thoroughly well studied, the drawings of which are remarkably well rendered.

The projects exhibited by Italy and Spain, with one or two praiseworthy exceptions, are notable rather for their originality — even eccentricity at times — than for competent handling.

The architectural exhibit of Switzerland, though consisting mostly of designs of minor importance, is more complete than that made by any other country, nearly every canton being represented. Designs of hospitals, schools, asylums, and other public institutions, predominate. They are generally noteworthy for the ability shown in their ground-plans, which are mainly well adapted to their various requirements. But few attempts are made at any architectural effect in the

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façades, which are, however, simple and appropriate. The Town Hall of Winterthur by Prof. Semper offers a striking exception in this respect. The design, by Goss, of a theatre for the city of Geneva, is also an exception. This project is unmistakably inspired by that of the Grand Opera House of Paris by Garnier. On a much smaller scale are to be recognized many of the salient features of that remarkable edifice, so superior to all others of its class in truthfulness of design, where every important part in plan is properly accentuated in elevation, and which, though not faultless, is yet much to be admired for its variety, and that richness of ornamentation so appropriate to such a monument.

That important problem, viz., the amelioration of dwellings for the laboring and industrial classes, has been almost entirely ignored at the Centennial. This absence is especially to be remarked upon, so much attention having been paid to this subject, particularly since the Paris Exhibition of 1867, when the French Emperor received a special medal for his well-merited and successful efforts in this direction. Holland and Switzerland alone furnish projects of this class; and these are very incomplete and unsatisfactory. That such buildings can be made a practical success is proved by the report of the "Improved Industrial Dwellings Company" of London, which states that no less than ten thousand persons occupied dwellings under their control in January, 1876; while their available capital was then £1,000,000. To the untiring zeal displayed during the past fourteen years by Sir Sidney H. Waterlow, chairman of the association, is due in a great measure the success of this enterprise.

Permit me, in conclusion, to allude to the unavoidable absence of our venerable President. His absence is to be especially regretted on this occasion, full as it is of past associations, present interests, and aspirations for the future; for, during half a century of indefatigable professional industry, no one among us has done more to raise the standard of our noble profession. To the record of none, whether as regards ability, integrity, or perseverance, may the architects of this country better look back for example and encouragement. Unsatisfactory in many respects as the architectural exhibit at the Centennial Exhibition is, he could not have failed to appreciate the marked change and progress made in our profession during the past fifty years, — an advancement which his own conscientious professional life has largely influenced.

ARCHITECTURE AND ARCHITECTS AT THE CAPITAL OF THE UNITED STATES FROM ITS FOUNDATION UNTIL 1875.

BY ADOLF CLUSS, F.A.I.A.

THE capital of the United States was selected after mature reflection, and was nursed by professional talent from its start.

In February, 1791, Thomas Jefferson, as Secretary of State, appointed Major Peter Charles L'Enfant "to draw the Federal town and buildings." L'Enfant was a young French engineer-officer who had volunteered in the war. He was the author of the picturesque plan of Washington. An uncontrollable temper often brought him in conflict with the executive authorities, so that his official head was cut off on March 6, 1792, after one year's service. He died in 1825 in the vicinity of Washington. The foundation of the new city was coincident with Stuart's publication of "The Antiquities of Athens," which, opening a rich, unexplored mine, was followed by a predilection for the pure Grecian style and its historical revivals.

The United States Capitol and the President's House claimed first attention in the new city. Jefferson, whose experience and taste, acquired and cultivated while he was ambassador at the court of France, were highly appreciated, wrote on April 10, 1791, "For the Capitol I should prefer the adoption of some of the models of antiquity which have had the approbation of thousands of years; and for the President's House I should prefer the celebrated *fonts* of modern buildings."

A premium of five hundred dollars and a building-lot was offered for the best design for the Capitol. A contemporaneous expert writes, "This was done at a time when scarcely a professional architect could be found in any part of the United States; which is plainly to be seen from the pile of trash presented as designs."

Stephen L. Hallet, a French architect, presented plans on July 17, 1792, and his employment as architect followed. But shortly thereafter Dr. William Thornton, an English amateur of versatile manners, who had come from the West Indies, succeeded in having Hallet's plans superseded by what he claimed as his own plans, and in having the premium awarded to himself. The commissioners received instruction to act with as much delicacy as possible, and to retain Hallet in the public service; but he demurred to these arrangements, and a rivalry between the amateur and the architect followed, each of whom repeatedly modified his plans, so that after the foundations had been raised to the floor-line of the cellar, they did not fit the latest issue of either plan. Thornton had, it appears, carried the day by a neatly washed elevation; and when his ground-plans were corrected according to sound principles of construction, they looked so remarkably like Hallet's that this gentleman formally protested against the award, claimed the original invention, and begged leave to present proofs of it. Quarrels ensued: the commissioners demanded Hallet's plans; he refused to surrender them, and they in turn discharged him about July 1, 1794. Thornton was a thorough man of the world; he founded a race-course, and sported blooded horses. Hallet's name disappears from history after this time; but Thornton's claims were ridiculed before long. In the year 1804, Architect Latrobe denounced his plan in an official report to Congress, and animadverted upon the mode of carrying on the competition for plans of this great public building. He intimated that Thornton's work in the premises, being simply pictorial, could not claim dignity and consideration as an architectural composition. Hallet's original designs were restored to the archives of the Capitol after the lapse of many years, in 1871; and his memory stands vindicated at this day.

The second architect of the Capitol was George Hadfield, who had been requested to come from England, with a view to an engagement on the public buildings. He took charge of the work after Hallet's forced retirement, but was also compelled to resent the slights of Thornton and his fellow commissioners. These men in a rude manner sent Hadfield word on May 10, 1798, that his services were no longer required. Hadfield died in Washington in February, 1826. The City Hall and brick buildings with rough-cast fronts, in the Ionic style, at either side of the President's House, for the accommodation of Treasury, State, War, and Navy Departments, are his work.

Hadfield was succeeded by James Hoban, on May 28, 1798. Hoban was an Irishman, was educated at Dublin for the profession, and settled in 1780, in Charleston, S.C. After the conception of the capital, Hoban had come to Washington well recommended, was successful in the competition for designs of the President's House, was employed to construct it, and had it sufficiently advanced for occupancy in 1799. Still he could not please the civil authorities at the Capitol; and his connection therewith was ended in 1803, the north wing of the Capitol having been finished while he was in charge. The executive authority of the District was transferred from commissioners to a superintendent of public buildings in the year 1802.

Benjamin H. Latrobe, a native of Yorkshire, England, who was educated in Germany, had made the tour of Europe, and finally had studied with Cockrell, a prominent English architect, came over in 1796 to Norfolk, and settled in Richmond, Va., where he designed the penitentiary and several mansions. In 1798 he removed to Philadelphia, where he built the old water-

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works on Penn Square, the old Banks of Pennsylvania and Philadelphia, and designed the Bank of the United States, subsequently built by Strickland, a pupil of his. Latrobe was called from Philadelphia to take charge of the work on the public buildings in Washington, in 1803. He accepted, and availed himself of Hadfield's services in the prosecution of the work. About New Year of 1804 Latrobe stated in a report, "The hall in which the House of Representatives is now assembled was erected in part of the permanent building. The whole of the masonry is of such bad workmanship and materials, that it would have been dangerous to have assembled within the building had not the walls been strongly supported by shores from without." This was no doubt due to the commissioners and the architects pulling in opposite directions.

Latrobe rebuilt considerable portions of the work; the old east front is considered as his work, and the south wing of the original Capitol was completed under him. The scarcity of money under Jefferson's administration protracted the work so that in 1814, when the Capitol was blown up by the British, nothing was finished besides what was indispensable for occupation. The centre part, afterwards occupied by the rotunda, consisted simply of a temporary frame passage connecting the two wings. After this act of vandalism had been accomplished, Latrobe conducted the reconstruction of the building in a thorough manner. He introduced in the north wing, columns with capitals of a composite order, in the decoration of which he worked leaves and fruits of the cotton-plant, tobacco-plant, and Indian corn. Latrobe kept on good terms with powers of the day until 1817, when a new superintendent was appointed by President Monroe. With him Latrobe soon came in collision, and resigned. He removed to Baltimore, built the cathedral and a part of the Commercial Exchange, and died in 1820, in New Orleans, where he was engaged in the construction of water-works.

President Monroe had become acquainted with Charles Bulfinch of Boston. He was pleased with his designs in the State House, in work done on the North and South Churches in Boston, in the State House at Augusta, Me., etc. Shortly after his inauguration as president, he invited Bulfinch to take Latrobe's place. He accepted only after Latrobe's absolute resignation, and proceeded to complete the wings. He also built the rotunda, old dome, and library, mainly by Latrobe's plans. Bulfinch kept on the work until the completion of the original Capitol in 1830, when he returned to Boston, and died in 1844 at an age of eighty-one years.

In the year 1850 the necessity for an extension of the Capitol was officially recognized. Competitive designs were invited by a committee of Congress, of which Jefferson Davis was chairman. A premium of five hundred dollars was offered to the successful author, and the right was reserved to Government to combine the merits of various plans.

Architect Charles F. Anderson, an Irishman by birth, received the premium, which was paid from the contingent fund of the Senate. After the award, President Fillmore, on whom rested the final decision, had an interview arranged, to which all the competing architects were invited. Mr. Thomas U. Walter of Philadelphia was intrusted with the designs and work under radical changes of the premiated design. He kept on the work until they were virtually completed. Lieutenants M. C. Meigs and Franklin shared the responsibility of the execution of it for a number of years.

The old Capitol has fronts of a porous gray sandstone from Aquia Creek on the lower Potomac; the extensions are faced with Lee marble; its architecture is in the spirit of Italian Renaissance of the sixteenth century.

Since Mr. Walter's retirement, Mr. Edward Clark of Philadelphia, a pupil of his, has been in charge of finishing the building. The total cost of the Capitol has been about $13,000,000, of which $2,700,000 had been expended before the extensions were commenced.

In the history of the Capitol it was incidentally mentioned that James Hoban, one of its architects, designed and built the "White House," originally termed the "President's Palace." President Adams moved into it in 1799, before the stairs were up. His wife used the now celebrated East Room for a drying-room to hang up clothes in. The White House had hardly been fully completed in 1814, at a total cost of $333,307, when the British burned it. The reconstruction, including the addition of two porticos, was again in charge of James Hoban, and involved an expense of $301,496.25. The style of the White House is also Italian Renaissance, and does not compare unfavorably with similar edifices erected in the Old World at the same time.

Architect Robert Mills of Charleston, S.C., was engaged by President Jackson in 1830, for the government buildings of the capital. He was a pupil of James Hoban. Besides his connection with the public works in Washington, Mills has built the Monument Church in Richmond, the State Capitol at Harrisburg, the Philadelphia Mint, etc.

A building for the Treasury Department was originally erected by Hadfield between 1794 and 1799. In 1801 a fire swept part of it off. The British burned the whole building during the invasion of 1814. It was commenced anew in 1817, finished in 1823, and destroyed again by fire on March 29, 1833. In 1835 Robert Mills was appointed as the first architect of the Treasury Building as it now stands; he designed and erected the fire-proof columniated east wing. In 1855 plans for a hollow square, of which the east front already built should form one side, were taken up.

The designs of Architect Thomas U. Walter were adopted, and placed in the hands of the officials of the Treasury Department for execution.

Before the year 1850 the United States had but few and insignificant buildings of its own erected outside of the great seaports. Its customs-offices, post-offices, and court-houses were kept in rented or purchased buildings of entirely inadequate accommodations.

A general demand for new buildings sprang up, yet there was no legislative authority for the employment of architects. Ammi B. Young had designed, and had been in charge of the erection of, the Boston Custom House, a building in which the ambition of his life culminated. He was appointed to a fifteen hundred dollar clerkship, was set to work planning custom-houses, post-offices, court-houses, mints, marine hospitals, etc.; and from this humble beginning a bureau grew up rapidly which has controlled an annual expenditure of many millions on public buildings.

Under Young, the south front of the Treasury was completed in 1860, and the west front commenced. A massive facing of granite from Dix's Island in Maine was adopted for both instead of the porous sandstone used on the east wing. The west wing of the Treasury was finished in 1864 by Isaiah Rodgers of Cincinnati, the architect of the Astor House in New York, who succeeded Mr. Young as supervising architect. The fourth or north front of the Treasury Department was completed in 1870 under A. B. Mullett, the successor in office of Rodgers.

The style of the Treasury Building is purely classic, and based upon an enlargement of the Ionic columns and capitals of the Erechtheum in Athens as the æsthetical element. The cost of the completed fire-proof building, the extreme dimensions of which are 264 feet by 468 feet, has has been about $7,000,000.

On the site of the south wing of the present General Post-Office, there stood Blodget's Hotel. It was bought by the Government in the year 1810, arranged for post-offices and for Patent Office, and in the year 1836 was consumed by fire. W. F. Elliot of Washington made the plans for the south wing of the present Patent Office Building, the construction of which was in charge of Robert Mills, who was displaced in 1851 by Thomas U. Walter, who revised the plans thoroughly, and put

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Edward Clark in charge of the building operations. This gentleman completed, about the year 1867, the whole fire-proof building, which forms a hollow square of about 330 feet by 450 feet in size, and three stories high.

The south front is faced with Aquia Creek sandstone, and the three later wings with Maryland marble. The portico in the centre of the south front is copied from the Parthenon at Athens; and from this purely classic motive the design of the whole complex mass is developed, an imposing mass in a valuable and pleasing material. The cost was $2,700,000.

Of the present General Post-Office Building, the south wing was commenced in the year 1839, and completed after designs and in charge of Robert Mills. The three other wings completing a hollow square were commenced in 1855, and finished in 1866, according to the plans of Thomas U. Walter; the work being executed under the superintendence of officers of the Engineer Corps, assisted by Edward Clark. Its style leans to the palace architecture of Italy in the *cinquecento*, and more especially to compositions of Palladio. The extreme dimensions of the building are 300 by 200 feet; it contains a finished basement and three stories, and cost nearly $1,900,000.

Next in chronological order a smaller department-building and conservatories, for the use of the Department of Agriculture, were designed and erected by Adolf Cluss of Washington, in the years 1867 to 1869. The material for the main building is pressed brick, with brown stone base and wrought work. The style leans to French Renaissance with mansard roof. The conservatories are kept in light Moresque forms. The expense involved was about $175,000.

The State Department used to occupy a plain structure at the north-east corner of the present Treasury Building, to the extension of which it had to give way. In 1869 it was concluded to build a hollow square to the west of the President's House, corresponding in size with the Treasury Building, which stands to the east of it. The combustible buildings on the site, now occupied by the War and Navy Departments, are to be razed, and a large new building is to accommodate all the three departments spoken of. A competition for designs was instituted, and a Philadelphian obtained the first prize. In 1872, however, other designs prepared under A. B. Mullett were adopted. In these the conditions prescribed for the competition were set aside; and up to date $5,000,000 have been appropriated for the work. The south wing has been completed, and the walls of the east wing are partly up. The façades of the building are designed in the rich forms of Italian Renaissance, with superincumbent Doric orders for each of the three stories, raised upon a rusticated entrance story. The cut-stone fronts are uniformly wrought in unpolished gray granite. A system of portly mansard roofs is used for covering in this building. Since Mullett's retirement the work has been transferred to the Secretary of War, and by him placed in charge of Orville E. Babcock, an engineer-officer of the army.

Having completed the review of the principal Government buildings, we come to the Smithsonian Building, which occupies a position akin to a Government building. Mr. James Renwick of New York was selected as architect, after a competition for designs in the year 1846; and he erected a building of red sandstone, in mediæval style, at a cost of about $325,000. Not being fire-proof, a conflagration consumed a large part of it in the winter of 1865, after which it was reconstructed and the major part of it fire-proofed under Adolf Cluss, at an expenditure of about $130,000.

Along with these public buildings, a notice is due to the building of the Corcoran Gallery of Art, erected for public use, by W. W. Corcoran, a public-spirited millionnaire. This home of art was erected in French Renaissance from designs of James Renwick, of New York. It has fronts of pressed brick work, with red sandstone wrought work, and cost about $200,000.

The municipal authorities of Washington had the City Hall designed by George Hadfield, who began its erection in 1820. It was finished by others in 1849, and has been sold lately to the General Government for the use of the courts. The local government now maintains its dignity in rented dwellings.

The local government owns a number of fine large school buildings, which were rewarded by a medal of merit for "Progress in School Architecture," at the Vienna International Exhibition. They are the work of Adolf Cluss.

Among public institutions owned by private corporations, must be mentioned the buildings of the Howard University, on the confines of the city. They were erected between the years 1866 and 1871, and are the work of Henry R. Searle of Washington. They involved an expense of $300,000, and were erected of a concrete stone called "the American building block." A pleasing effect in a plain modern architecture is reached by alternating the color of the blocks.

The Louise Home, an asylum for worthy aged females, due to the generosity of W. W. Corcoran, was erected about the year 1870, under E. G. Lind, the architect of the Peabody Institute in Baltimore, in chaste modern architecture, at a cost of $200,000.

The Masonic Temple was erected in the years 1867 to 1869, in French Renaissance, under Adolf Cluss. It has a granite entrance story; above there are ashlared fronts of Connecticut brown stone with heavy Nova Scotia sandstone wrought work. It cost about $180,000. A mansard roof remains unfinished for want of funds.

The church architecture, as well as the private architecture of the city, had lain dormant until the outbreak of the late war, before which time noteworthy improvement of these classes were only sporadic.

Some of the new work, contributed by a number of conscientious and able practitioners, compares favorably with that of other cities; but since the review of the Government buildings, which form the prominent architectural feature of Washington, has taxed the patience of the convention too long already, this part cannot be enlarged upon at the present occasion.

The Washington National Monument, which has been the stumbling-block of the century, must finally be alluded to. Its agonies are of long standing.

On Aug. 7, 1783, the Continental Congress resolved on the erection of an equestrian statue of Gen. Washington at the future capital, and futile efforts were made from time to time to make good this resolve. At length prominent citizens, headed by Chief Justice Marshall, formed in 1833 a voluntary association, and invoked the people of the country to assist them in redeeming the plighted faith of their representatives. In 1845 they obtained from Robert Mills a design for a monument composed of a circular colonnaded Doric building 250 feet in diameter, and 100 feet high, from which starts an obelisk-shaped shaft 55 feet square at the base, and 600 feet high above the foundations. The estimate of cost was $1,120,000. This design was signed by the President of the United States and other public men, lithographed, and circulated in large editions, as a diploma to the contributors. In 1847 a net sum of $87,000 had been turned in from the collections, and the work on the shaft was commenced. The corner-stone was laid with imposing public ceremonies, on July 4, 1848. In 1855 the shaft had been raised 174 feet, and $230,000 had been spent, which exhausted the funds of the association. On Feb. 22, 1855, a special committee of Congress recommended an appropriation of $200,000, to aid the funds of the society. About that time, the Pope of Rome, responding to the broad invitation sent throughout the world, had like many other potentates, states, towns, and societies, sent a valuable contribution block. This displeased a powerful political organization of that time so much that one night they broke into the shed, and smashed the block into atoms. They followed up this action by taking violent possession of the monument, the office, and papers, and held on to them until October, 1858. For these three years no more work was done, and no collections were turned in. To pre-

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vent a repetition of such scenes, the survivors of the original movers organized under a charter from Congress on Feb. 26, 1859; but the long period of inactivity had chilled public and private sympathy, and destroyed confidence in the ultimate success of the undertaking, so that since twenty-one years not a stone has been cut or set, nor any thing done to relieve the monotony of the faithful watchman's weary hours.

On Jan. 13, 1874, the House of Representatives had another fit, and ordered the old sore to be doctored once more by a committee of thirteen. The committee procured from the Corps of Engineers of the army a recommendation to do away with the colonnaded structure, and to decrease the altitude of the shaft to 438 feet.

The Committee of the House recommended the completion of the monument according to the plan edited by the lieutenant with the scissors, and advocated a sufficient appropriation to have it done before July 4, 1876. With this good intention on record, the movement stopped once more. But on Aug. 2, 1876, Congress appropriated, without much discussion, $200,000 "to continue the construction of the Washington Monument." The work is to proceed under a committee, of which the Architect of the Treasury, the Architect of the Capitol, and the Chief of Engineers, U. S. A., are the expert members. An examination was prescribed to be made as to the sufficiency of the foundation, prior to commencing any work; and in case of an adverse decision, the appropriation would become null and void. At the solicitation of the committee, a board of three generals of engineers have been assigned, and are now engaged upon the duties of the new inquiry.

On July 17, 1876, was filed under the United States copyright laws "A Revised Plan of the Monument." This is a new modification of the military modification of 1874. It is claimed that the appropriation has reference to this apocryphal compound. The wording of the late act appears to bind the committee to whatever plan it had reference to, after it has been satisfied of the sufficiency of the foundation.

The naked stack they are now attempting to erect is made plausible to the general public by calling it an obelisk. Hence it is proper to state what constitutes an obelisk in the art-historian's meaning of the word, and the rank occupied by such structures in the annals of architecture.

The oldest and most colossal monuments of the earth, the solid cut-stone pyramids of Lower Egypt, are believed to have been erected about 3000 B.C. They were faced with polished granite, bearing inscriptions, on their outside as well as within their gorgeous chambers, and do not represent the beginning, but rather the culminating point of perfection, of the art of old Egypt.

The hieratic monarchical Egypt of the Pharaohs, beyond which the trace of history does not reach, rests upon the dust of a much older social organization, the national life of which, for countless ages, bore a cheerful countenance in striking contrast with the official mask of royal Egypt and its rigid conventionalism. It had developed a free art, reminiscences of which are found in the pleasant pictures from public and family life decorating the grottos, contemporaneous with the pyramids. Herodotus wrote, "The Egyptians are in their customs and laws the very opposite of all other nations." The father of history had followed all other nations under his observation from infancy through a period of rise to a culminating point of perfection, which was followed by a state of lingering decline; but in Egypt he was confronted with and puzzled by a people which at the very gates of history was already in a state of decline, so that modern Owen Jones writes, "The more ancient the monuments of Egypt, the more perfect is the art. All the remains with which we are acquainted exhibit the art in a state of decline which is doubtless inferior to the unknown perfection, but still far beyond what followed after." During the earlier period of the so-called "old empire" of Egypt (first to twelfth dynasty, 3000–2000 years B.C.), only small-sized obelisks, from two to ten feet high, are traced; they were used for sepulchral purposes. The lofty, characteristically developed forms first appeared under the twelfth dynasty, which was followed by a contempt of art during the conquest of Egypt by the nomadic Hyksos. With the reinstatement of national sovereignty under the seventeenth dynasty, the art revived, in an age of conquests, prosperity, and luxury. It was soon inflated and weighed down by overdone ornamentation and lifeless conventionalism. Colossal sitting statues of kings and gods were placed in pairs in front of the traditional pylons flanking the propylæ of the temples; re-enforced by obelisks which in turn were set in front of these statues. The era of obelisks dawned: it culminated under the nineteenth dynasty (1600–1400 years B.C.). Pliny describes an obelisk set by Rameses Memnon Osymandyas, the Napoleon of ancient Egypt (1600 B.C.). It was 120 cubits (about 150 feet) in height, and thousands of men were employed on it. Rameses, apprehensive that the workmen might give out while raising the monster block, tied his son at the last moment to its upper end, so as to have the obelisk guaranteed by the increased care for the endangered life of the heir-apparent. These historical obelisks were mostly rose-colored, quadrangular, granitic monoliths of exquisite workmanship, from the quarries near Syena in Upper Egypt. They were from 50 to 150 feet high, diminishing gradually until they terminated near the top in a four-sided pyramid, termed pyramidion. The width of the base ranged between one-tenth to one-thirteenth of the height to the base of the pyramidion. The sides of the obelisks were polished, and served to form huge tablets. On these tablets hieroglyphics were sculptured in *relief en creux*, i.e., worked in relief upon a sunk ground. They were to record facts, and to serve also as architectural decorations, by perpetuating for all time in a descriptive and illustrative style the glorious deeds of the founders of the palaces and temples. The obelisks were carved after they were set in place: hence some of them have remained plain, i.e., unfinished. The hieroglyphics were finished in polychrome throughout, mostly in the primitive colors, — yellow, red, and blue. Thus decorated, the obelisks appeared as if wrapped up in carpets of rich Oriental patterns. This was no doubt a reminiscence of early times when the Egyptians decorated the wooden posts of their primitive temples by tying their native flowers around them.

Religious laws forbade a change, after such a form of decoration had once become sacred; and this was the reason that the nightmare of conventionalism haunted free art, and that color, the true function of which is to *adorn*, was made to *speak* besides. The upper part of the pyramidion was gilded, and the whole surface of the obelisks coated with a most efficient preserving silicate.

The obelisks were generally set on slightly projecting plain low plinths, which gave an unsatisfactory effect. It was increased by arranging the hieroglyphics symmetrically, setting them close and thick at the top and bottom of the sides, and more open in the intermediate space, so as to produce the general impression of a base, shaft, and capitulum.

When Cambyses, King of Persia, conquered Egypt (under the 26th dynasty, 525 B. C.), he felled to the ground all the obelisks of Lower and Middle Egypt, sparing but one at Heliopolis, the size, proportions, and harmonious coloring of which struck him with awe. Its colors have bleached; but after more than twenty-four hundred years, it still stands erect near the village Maturiah, and defies the destructive elements amidst a world of historic rubbish, in which the archæologist delights to scratch. The lofty monoliths are now found buried under the deposits of the Nile and the sand of the desert. They designate the lost sites of the ancient cities, and the immense architectural activity of a time, the very records and alphabet of which have been lost by

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the burning of the Alexandrian Library under Cæsar, and the destruction of what was saved, by the fanatical mob of Bishop Theophilus under Emperor Theodosius. These accidents account for the conflicting statements of modern authors, which have been gradually reconciled, after an old Grecian translation made by Hermapion, an Egyptian priest, had been positively traced as referring to the hieroglyphics on the Flaminian obelisk in Rome. The merit of the important discovery of the lost key is partly due to Prof. Scyfforth, the Egyptiograph, now residing in New York.

After the conquest of Egypt by the Romans (48 B.C.), Augustus and his successors drained the valley of the Nile, and the tombs hewn out of its mountains, of whatever was portable, for the gaze of imperial Rome, — of sarcophagi, urns, furniture, mummies of princes and priests, and of obelisks, — those mummies of a congealed civilization. Twelve or more of these obelisks were shipped to Rome, and one to Constantinople. The architectural tact of Rome provided for the mounting of the re-erected obelisks upon more or less elaborate high pedestals. This was found necessary, since the flatly carved hieroglyphics, deprived of their polychromatic adornment, failed to enliven the large granite surfaces. The obelisks were exhibited upon those Roman pedestals until the overthrow of the Roman empire by the barbarians (sixth century A.D.). These upset them a second time, and broke several of them in pieces by the fall. After having been buried in rubbish and ashes for another thousand years, the Popes Pius V. and Sixtus V. (1566, 1590, A.D.) had them excavated once more, patched, set up anew in good taste by the artists and engineers of the Italian Renaissance period, and had them shaped so as to have the pyramidions terminate in huge gilded crosses. The obelisk on the Monte Cavallo (Quirinalis) was placed in the centre of artistic equestrian groups, and set upon a pedestal about thirty-six feet high above ground.

In 1820 the English shipped one of the obelisks, formerly decorating the propyla of the palace of Luxor, near Thebes, and raised it on Waterloo Place. In 1831 Mehemet Ali presented its twin to the French Government, who mounted it appropriately in the Place de la Concorde at Paris. Both monoliths are exhibited in the open air, just as are scores of mummies within the British Museum and the Louvre.

It is not surprising that these quaint, homeless monster blocks, roughly knocked about for thousands of years, should have excited curiosity and interest. By their re-erection in prominent places they have become more familiar to the average citizen than the antique art-treasures, hid away in the museums. But an unpardonable anachronism would be committed by copying even a *bona-fide* obelisk for the present purpose. An inscribed pillar detached from the palaces of the Pharaohs would be a most improper form for perpetuating the civil and military virtues of George Washington, one of the most humane of men. Architecture is defined as the material expression of the wants, faculties, and sentiments of its age. Formal types and symbols, primarily the common property of groups of nations, have been gradually transformed and perfected in the onward march of civilization; and a return to the unarticulated mode of expression resorted to in the earliest stages of society would be a declaration of bankruptcy on the part of the taste of the age.

It is still less justifiable to construct an unsightly huge pile of masonry faced with scaling cut stone, to palm it upon the public as an obelisk, simply because geometrical outlines have been copied off-hand, and finally to claim credit for surpassing the size of the original. But this is being done with the National Washington Monument, by far the most pretentious structure of the kind on the continent. The effort is not even original. When an Asiatic despotism was established on the banks of the Euphrates, which outshone the glories of the Egyptian Pharaohs, a monument was resolved upon which should likewise surpass the pyramids of Egypt, "a tower whose top may reach unto heaven" (Gen. xi.). This is the noted Tower of Babel, the ruins of which have been lately identified on the western banks of the Euphrates. Herodotus, an eye-witness, describes it as a pyramid of 600 feet in height, reared in steps upon a base of 600 feet square. The apex was crowned by a large temple furnished with a golden table and sleeping-accommodations for the god Belus. By the side of the rival imitation in Babylon, we cannot even brag of outdoing the original pyramid of Cheops at Ghizeh, since solids are compared by cubic contents, and not simply by the one factor of height. That pyramid contains 90,000,000 cubic feet of masonry, against less than 700,000 cubic feet in the modified monument.

The former difficulties of moving heavy monoliths are hardly reckoned at present. The heaviest obelisk weighed about 3,000,000 pounds. The granite base of the monument of Peter the Great, in St. Petersburg, is 42 feet in length, 36 feet in width, and 21 feet in height; it weighs about 5,500,000 pounds. The great granite vase in front of the Berlin Museum has 22 feet diameter, was worked out of a block 26 by 25 by 27 feet in size, weighing 2,750,000 pounds, and in its finished artistic form, still weighs 150,000 pounds.

The print of the Washington Monument, now being officially circulated, even undertakes to show off in profile, by way of comparison, the heights of the apexes of various renowned structures, such as St. Peter's in Rome, St. Stephen's in Vienna, St. Paul's in London, the Cathedral of Strasburg, etc., in order to prove also superiority in this respect. This is probably the first time that any one to whom has been confided the shaping of a great national monument has undertaken to discard quality, and in earnest to compare by the surveyor's pole the work of artistic genius with a pile of stone. To admit that the present plans represent a monumental obelisk, is equal to mistaking an artist's easel with a blank canvas for a finished work of art. For many years the design of the monument has been condemned by the well-nigh unanimous verdict of the art-critics, the profession, and of the amateurs of cultivated taste, of this country and elsewhere; but their overwhelming grounds of objection have never before been presented in concise form: hence these lengthy remarks. The view has prevailed among the worthy and enthusiastic gentlemen of the Monument Society, that thousands of dollars having been contributed towards the monument as printed and vouched for on the old diplomas, it would be bad faith and even sacrilegious to tear it down, and substitute forms worthily perpetuating the great man and the standard of monumental art, instead of being a stigma upon the era of its erection. Public opinion is being appeased by the explanation that by tabooing the strained effort toward a mausoleum, the chastity of the primitive Egyptian style is vindicated.

The adornment of the uncouth form of the plain truncated pyramid is demanded by modern culture, even where it is born of plain regard for stability, as with the stacks of factories. It is a strange confusion of ideas to claim this mere skeleton-form as the prototype of the polished Oriental monoliths of exquisite material and unsurpassed workmanship, the polychromatic ornamentation of which spoke in ideographic letters the history of a prosaic and persistent people, who in art matters and construction were autodidacts in the strictest sense of the word.

The design of the monument was adopted at a time when, with the exception of a few public buildings, the cities of the continent from Maine to Texas consisted of brick and frame houses of materially the same strictly utilitarian hap-hazard character. Hence the reverence for the noble object, which should not be confounded with the awkward mode of expressing it, resorted to at a time before the national taste had any development at all.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

(SUPPLEMENT.)

TENTH ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS, HELD AT PHILADELPHIA, PENN., OCT. 11 AND 12, 1876.

PROCEEDINGS OF WEDNESDAY, OCT. 11.

MORNING SESSION.

THE Tenth Annual Convention of the American Institute of Architects met in the Mercantile Library Building on Tenth Street, Philadelphia, Oct. 11, 1870. At ten o'clock the Convention was called to order by the Vice-President of the Institute, Mr. THOMAS U. WALTER, who presided in the absence of the President. The Secretary of the Institute, Mr. A. J. BLOOR of the New York Chapter, acted as Secretary of the Convention.

Mr. WALTER, in taking the chair, welcomed the Convention as follows: "Gentlemen of the American Institute of Architects: In the name of the Philadelphia Chapter of Architecture, I welcome you to our city and to our hospitality. I trust that you will find much to interest you, not only here but in the things about us, in the crowds that we have in our city, and in the magnificent display we have on the other side of the Schuylkill; and we of the Philadelphia Chapter of Architects trust that you will have a happy time."

The Annual Address was read by the Secretary, Mr. BLOOR.

[See Appendix A.]

The Report of the Board of Trustees was read by the Secretary, and laid upon the table.

[See Appendix B.]

The Treasurer, Mr. R. G. HATFIELD of the New York Chapter, presented his Annual Report with vouchers. A Memorandum Report, covering the year since the last Convention, was read. The Chair appointed as the Auditing Committee, Messrs. Murdoch of Baltimore, Stone of Providence, and Longfellow of Boston, to whom the Report of the Treasurer was referred.

Mr. WARE of Boston, on behalf of the Committee on Education, asked leave, which was granted, to defer the presentation of its Report until the following day.

The SECRETARY then read the Report of the Committee on Publications, which was laid upon the table.

[See Appendix C.]

Reports were read by the SECRETARY from the New York Chapter, the Chicago Chapter, the Baltimore Chapter, the Albany Chapter, the Philadelphia Chapter, and the Rhode Island Chapter; the Reports of the Chapters at Cincinnati and Boston not being presented.

[See Appendix D.]

The Report of the Secretary of Foreign Correspondence, not having been received, was deferred.

The PRESIDENT requested the Convention to appoint a time for the delivery of the closing address by the REV. DR. MAGOON of Philadelphia. The Secretary moved that the address be delivered at eight o'clock on the following evening.

MR. WARE. — If the Committee of Arrangements have reason to suppose that the majority of the members of this Convention will remain over until Friday morning, or that their places will be taken by the general public, well and good; but I should be sorry, as a member of this Institute, to again have the gentleman who delivers the closing address deprived of the audience he deserves.

The SECRETARY. — The Committee of Arrangements have been governed by the very considerations suggested by Mr. Ware. It has happened heretofore, as Mr. Ware says, that the speaker of the closing address has been left without an audience; and for that reason the Committee of Arrangements placed it at the end of the business of the Convention, in order to secure at least the audience already assembled. The suggestion has now been made to change the order of time for the delivery of the address; but if any change is to be made, I hope the Institute will give due notice of the fact to members and to the public.

It was finally decided that the closing address should be delivered at four o'clock on the afternoon of the following day.

The Report of the Committee of Inspection and Advice was read by Mr. Longfellow, and laid upon the table.

[See Appendix E.]

The SECRETARY read the Report of the Board of Trustees on a general form of building-contract, submitting therewith a blank form of contract prepared under the direction of Mr. Haight, who had been appointed a committee by the Board for that purpose.

[See Appendix F.]

The consideration of this Report being postponed till afternoon, the Convention adjourned to meet again at two o'clock.

AFTERNOON SESSION.

The Convention re-assembled at two, P.M. The reports from the Chapters in Boston and Cincinnati, and of the Secretary of Foreign Correspondence, not having been received, the election of officers and standing committees was first in order; and the Chair appointed Messrs. Le Brun and McLaughlin as tellers. Mr. Lind of Baltimore moved that a nominating committee be appointed; and the motion being voted, the Chair appointed Messrs. Ware, Schofield, and Murdoch. On motion of Mr. PFEIFFER it was voted that the election of officers should be postponed to the following day.

The PRESIDENT then called up for consideration the Report of the Committee of Inspection and Advice.

Mr. LONGFELLOW, on behalf of the Committee, drew attention to the two leading recommendations of the Report, that a Committee on Finance should be appointed to prepare an estimate of the expenses of the Institute for the ensuing year, and that some action should be taken for preparing a more definite scheme for the exercises of future Conventions. He invited suggestions from the members for these objects. By request of the Convention, that part of the Report which referred to them was re-read. The CHAIR called attention to the recommendation of the Committee, that the Institute should no longer charge itself with the expense of an annual dinner; and on motion of Mr. Pfeiffer, it was voted that payments by the Institute toward the annual dinners should thereafter be discontinued.

The SECRETARY moved that the question of finance and the appointment of a Finance Committee should be referred back to the Committee on Inspection and Advice, with directions to report in time to modify the By-Laws at the next Annual Convention.

Mr. LONGFELLOW, on behalf of the Committee, offered a substitute that a Special Committee be appointed to propose estimates for the expenses of the Institute for the ensuing year, and to offer an amendment to the By-Laws at the next Annual Convention, providing for the appointment of a Standing Committee on Finance, whose duty it should be to regulate and propose the estimates. The substitute was accepted by the Secretary.

Mr. PFEIFFER. — Since this Committee on Inspection and Advice has so thoroughly inquired into the affairs of the Institute, and into its arrangement, etc., and become so well acquainted with its workings, I think it would be to the advantage of the Institute to have the same Committee constitute the Committee on Finance; and I will move in amendment that it be appointed that Committee.

Mr. HUNT. — As I understand the motion, this Committee is to prepare its budget for the coming year.

Mr. LONGFELLOW. — The Special Committee for the coming year will have to do that; and then my resolution provides that after this year there shall be a permanent Committee of Finance.

Mr. STONE. — This matter requires consideration, and therefore it is important that time should be afforded for

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the preparation of a proper amendment, that the By-Laws may not get into a jumble. I should be very glad to hear any thing that may be said by the Convention *pro* or *con*, with reference to this resolution.

THE PRESIDENT. — The resolution is before the Convention, and to it Mr. Pfeiffer has moved an amendment that the Committee of Inspection and Advice shall constitute the Finance Committee.

The amendment was agreed to, and the resolution as amended was adopted.

Mr. LONGFELLOW called the attention of the Convention to the recommendation of the Committee that measures be taken to prepare a scheme of greater interest for the proceedings of future Conventions.

Mr. WARE moved that this portion of the report be referred to the Board of Trustees, whose duty it was to appoint for each Convention a Committee of Arrangements, consisting partly of members of their own body and partly of members of the Chapter in the city where the Convention was to be held. The motion was agreed to.

The PRESIDENT then called the attention of the Convention to the form of contract which had been presented by Mr. Haight.

Mr. LITTELL. — Would it not be better to postpone the consideration of this form until the members have had more time to consider it? I do not think it can be considered advisedly even by having it read section by section.

Mr. SEARLE. — There are many things in this form of contract, which I would desire to see altered; moreover any form which the Convention could adopt would require to be changed for different localities. I therefore move that the form be printed, and a copy sent to each member of the Institute, and that each member be allowed the privilege of corresponding upon the subject with the committee.

Mr. LIND. — I do not think any form of contract which the Committee recommends will be generally adopted by the profession; but I think that if this contract be approved and sent to members as a form which the Convention would recommend them to adopt, it would do all that can be done. Every city and State has certain peculiarities which it is obliged to embody in any form, and no contract can be put in universal circulation.

Mr. HARTSHORN. — Is there much change in this form from that sent out by the last Convention?

The PRESIDENT. — There are a great many changes.

Mr. PFEIFFER. — Mr. Haight, who was appointed a committee of one on the part of the Trustees who had this matter in charge, gave the subject very thorough consideration; and in addition to that, it was deemed advisable by the Trustees to appoint a committee to take legal counsel in this matter, and a lawyer who is well known, particularly in connection with matters of contracts, was employed by the Board of Trustees to prepare this form. Mr. Haight was in consultation with him from time to time, and reports were made to the Board of Trustees, until the counsellor employed by the Board came to the conclusion that this form as now presented is about as good a thing as he could devise. It was submitted to the Board, and by them approved; so that this is not only a plan prepared by a member of the Institute, but in its preparation he was aided by one of the best legal minds in New York.

The SECRETARY. — I think that if the form of a general building-contract were to be considered by the Institute year after year, it would never find one better adapted for general circulation than this at present under consideration. It is of course impossible to prepare a contract which will please all sections of the country. This subject has been considered and discussed as much as it is possible to discuss it, and an opportunity has been given to every member to say what he pleased in reference to it; and the form now submitted by Mr. Haight is the result of all this conference and consideration, and I think it would be a needless expense to print it.

Mr. LIND. — I move as an amendment to the motion of Mr. Searle, that the contract be adopted by the Institute and recommended to its members for general use.

Mr. PFEIFFER. — While this matter was under discussion in the Board of Trustees, Mr. Haight made a suggestion which struck me as a good one, and although it may not be strictly in order, I would like to repeat it here. I made up my mind that I would adopt it as far as I possibly could in my own practice; the suggestion being that the architect should decline to have any thing to do with the contract, but should tell his client that that was a matter for a lawyer to dispose of, and ask his client to let it be done by a lawyer instead of by the architect. I think we would save ourselves a good deal of annoyance and trouble if we would all act on that suggestion.

Mr. LIND's amendment was adopted, and the motion as amended was passed.

The SECRETARY then said that the Trustees desired to call the attention of the Convention to the anomalous position of some members who were members at large but joined no Chapter, or who joined a Chapter but paid no dues to the Institute. He moved to refer the matter to a special committee to report on the following day. The motion being carried, the President appointed Messrs. Hunt, Ware, and Stone as a Special Committee.

Mr. PFEIFFER suggested that this Committee should also consider how far the jurisdiction of a Chapter extended.

The SECRETARY then made known the desire of the Baltimore Chapter, that all papers presented should be published. A discussion followed as to whether, in view of the financial condition of the Institute, it would be advisable to continue the publication of the proceedings of the Institute, as heretofore, in quarto form, or whether an arrangement should be made with Messrs. Osgood and Co. by which such papers and reports as might be read at the Annual Conventions, as well as the discussions thereon, and such statistics as are usually comprised in the published proceedings of the Institute, should be published as a supplement to the *American Architect and Building News*. At the close of the discussion Mr. WARE said, "I would suggest that it might be practicable for the report of the Convention to be printed in the ordinary form of the journal, and then, instead of publishing a separate number of the journal, to have stereotyped plates made so that our proceedings could be printed in quarto form as they have heretofore been. I think it is a distinct advantage, if only a sentimental one, to the Institute, to have its proceedings printed in proper shape. As we have for many years continued this publication in its present form, and as we have been distributing them to the profession and to the foreign societies with which we are in correspondence, I think it is a little more dignified mode of publication to preserve our present quarto form than it would be to have it printed in an extra number of a newspaper. I think it might be practicable to have stereotype plates cast and put together in the form of a quarto pamphlet, and that perhaps it would not entail any very great expense. If it would be very expensive it might not be worth while to do it; but if no great expense is involved, I should prefer to have the present series of papers continued. I make no motion in the matter: I simply suggest this for the benefit of the Committee on Publications, as a general expression of views in reference to this subject has been asked for."

A motion to refer the subject to the Committee on Publications was agreed to.

The SECRETARY then read from the Report of the Committee on Publication the following extract concerning the *American Architect and Building News*:—

"Your Committee respectfully invite the consideration of the Institute to this subject, as the *American Architect and Building News* is the adopted organ of the Institute. Your Committee suggest that it might be valuable to have an expression of the understanding of the Convention as to how far the serial is to be considered its mouthpiece."

Mr. LONGFELLOW. — Mr. Wight at the last Convention said very wisely, that he had not much faith in organs, and he did not believe in committing the Institute to any thing a paper might say as to matter of opinion. I, on my own part, as the editor of the *American Architect and Building News*, should feel a responsibility greater than I could bear, if I were to assume, or if I were expected to assume, that what I said in the paper would be accepted as the doctrines or opinions of the Institute. I think the reasonable understanding in this case is that the only thing which the Institute should indorse, as far as the paper is concerned, is the official publication of its proceedings, and any thing else that it chooses officially to promulgate. I think the Institute could safely do that; and I think that the edito-

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rial part of the paper would not commit the Institute to any doctrine, theory, or opinion.

Mr. PFEIFFER. — I never looked to the *American Architect and Building News* as the mouthpiece of this Institute. I always believed that the paper was entirely independent in its opinions, and could say and do what it pleased; and it seems to me that if the paper be the mouthpiece for an organization like this, it would hardly be justified in publishing an editorial without submitting it to the inspection of agents or representatives of the Institute, for which it might be supposed to speak. I only understood that we were to give the paper as much support as we possibly could by having our proceedings published in it; and that really is more of a moral support than a pecuniary one, so far as the Institute is concerned. I do not see that this question ought to come before us for discussion. If we want a mouthpiece, we ought to publish one at our own expense, and not at the expense of the publishers of the *American Architect and Building News.* In the beginning of the life of the *American Architect and Building News,* I believe it did advertise itself as the organ of this Institute; and some question came up, to which Mr. Bloor can refer in the minutes, when some members of the New York Chapter objected to an expression of this journal. I said that if the paper advertised itself as the organ of the Institute, it ought to support the measures of the Institute, or something to that effect. The Secretary can refer to the minutes, and find out all about it.

The SECRETARY. — I have not time to look up the subject; but I know that there is upon the minutes of the last Convention the expression in some form that the *American Architect and Building News* is the organ of the Institute.

Mr. LONGFELLOW. — There never was any advertising of the paper as the organ of the Institute; and the only place where it is referred to is in the resolution brought forward by me at the last Convention, where it is simply said that it should be the organ *for publication* of the Convention. That resolution was expressly worded to remove any impression that it would be the organ of opinion of the Institute.

The SECRETARY. — I am very glad that the members are so unanimous in their opinion on the subject. The impression has certainly gone abroad in some way, that the journal is the organ of the Institute. The Albany people, I know, in the Capitol affair made a great point of it; and I also know that they made use of the term in something they published.

Mr. STONE. — I move that we re-affirm here at this time that the *American Architect* is not the organ of the American Institute of Architects, except for publication. I want to see the paper in such a condition that the editor is free to speak of the acts of the American Institute with perfect freedom; and if the impression has gone abroad that this journal is the organ of the Institute, let us do all that we can to dispel that impression.

Mr. LITTELL. — It is evident that the Committee spoke of the *American Architect and Building News* as its organ for purposes of publication, and not for all purposes. The Convention could not control the paper for any purpose. The last Convention made the *American Architect* its organ for publication purposes; and I should be very much pleased to see the words "for publication" inserted in the report of the Committee.

Mr. STONE'S motion was unanimously agreed to, and the report of the Committee was referred back for amendment on this point.

The PRESIDENT then called for any papers that members might have prepared for the occasion; and a paper upon the Architectural Exhibit was read by Mr. Hunt.

[See Appendix G.]

A vote of thanks was tendered to Mr. Hunt.

Mr. PFEIFFER. — Mr. Hunt in his paper alluded to Prof. Huxley. It seems strange to me that in England, as well as in this country, men of standing like Prof. Huxley should speak of architects in the way they do. I have often read articles in the English papers, — in the *Architect, Building News,* and the *Builder,* — speaking apologetically of our profession, and I have been much astonished that it should be so. It is only a few weeks ago that I read an article in the *Architect,* in which it said "our unpopular profession." I do not see why our profession should be unpopular in this country and in England. I know that it is not so in Germany, in France, in Prussia, and I do not think it is so in Italy, although I have not been there. In those countries the profession is looked up to as one of honor; and all grades of society, even the highest, are open to its members. I think, however, the cause of this feeling in England, and in this country also, against the profession, is what Mr. Hunt alludes to in his essay, — the matter of education. One of the objects of this Institute, and one which we have always had in contemplation, was the education of the architect; and I think it would be well if in all the cities of this country we had Institutes of Technology established, such as they have in Boston; and I think that the establishment of such institutes and the proper education of architects would do very much to place our profession in a better position.

In alluding to Prof. Huxley I am also reminded of similar remarks which were made by no other or less a gentleman than the very honorable Gov Dix in a late message. I was astonished that so distinguished a man should speak of architects in the manner in which he did. All he seems to think they are good for is to make plans, and after the plans are made the architect should be dispensed with and the building turned over to a builder. I was very much astonished to read his remarks; and I wish something could be done by the education of pupils, the establishment of proper institutes, and the taking of a higher grade in the profession, to bring the attention of the country to the true facts of this case, and to lead them to appreciate the profession more by becoming acquainted with its requirements. In France, in Germany, in Prussia, any one established as an architect is known to have gone through a severe course of study and examination. He cannot enter into the profession or governmental practice without being subjected to a very severe examination; and if that is done, he receives everybody's confidence. I am very sorry to say that it is not so in this country or in England; and therefore we ought to steadily labor to produce a different state of affairs.

Mr. SEARLE. — In relation to what Prof. Huxley said, those who were present at the dinner given two years ago by this Institute in New York will remember what was said there by a professor of Columbia College; and I think if we could have the words he said put in print in some way, it would be a sufficient offset to what Prof. Huxley has said. The professor of Columbia College had had the same idea that Prof. Huxley had, that an architect was good for nothing; and when he heard that an architect was to be employed on the college buildings, he said that they would get ornament without any utility. But after the buildings were constructed the professor said, at our dinner, that he was going to take back every word of it, and that they had got ability of every kind in the person of their architect, and he spoke in the highest terms of that gentleman. If the address of that professor was reported, I wish his exact words could be had.

Mr. LITTELL. — It occurs to me that the point of view taken by Prof. Huxley and other professional men in regard to our profession resembles that which we all take in regard to the medical profession. We do not care much for a doctor until we get sick, and then we generally think we must have a doctor for about five minutes. Mr. Huxley carries this doctrine to its fullest extent; and what surprised me most was, that entertaining the views he did, when he needed new buildings for his university he did not, instead of getting a bricklayer, get a brick to superintend the construction of the buildings for him.

On motion of Mr. HUNT the Convention adjourned to the following day.

PROCEEDINGS OF THURSDAY, OCT. 12.

MORNING SESSION.

The Convention was called to order at ten, A.M., Vice-President THOMAS U. WALTER in the chair.

The Report of the Committee on Education was read by Mr. WARE.

[See Appendix H]

The Report was laid on the table. The amended Report of the Committee on Publications was then read with amendments.

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[See Appendix I.]

The Report as amended was accepted. As the Report of the Cincinnati Chapter had not been received, the Report of the Boston Chapter was read.

[See Appendix J.]

The Report was accepted. The Committee on Nominations begged leave to report later, and the election of officers was deferred till the afternoon session.

Mr. HUNT next read the Report of the committee appointed on the preceding day upon anomalous membership.

[See Appendix K.]

The Report was then read three times.

The PRESIDENT. — Some of the members thought there was ambiguity in the By-Laws, and this Report is an explication thereof to the effect that inasmuch as any member of a Chapter is *ipso facto* a member of the Institute, and one cannot be a member of a Chapter without being at the same time a member of the Institute, it follows that when, for whatever cause, one ceases to be a member of the Institute, he ceases to be a member of his Chapter. Does the Convention accept that as the interpretation of what the By-Laws mean upon the subject?

On motion of Mr. PFEIFFER this interpretation was accepted.

The PRESIDENT. — The second recommendation of the Committee is that Fellows of the Institute are not necessarily members of Chapters established in places where they reside. Is that the understood meaning of the By-Laws?

The SECRETARY moved that this interpretation be accepted by the Convention.

Mr. FREDERICK. — I think that matters should be made so clear that no ambiguity could exist. Last year it was determined in Baltimore that any member dropped from a local Chapter for cause could not be restored to membership without the consent of the Chapter. The first provision of the law states that a member of a Chapter is *ipso facto* a member of the Institute, and being dropped from one is being dropped from the other. It seems to me that a Fellow dropped from a Chapter is not dropped from the Institute, according to the reading of this; and that is what I want to understand. If I correctly apprehend the report which has just been made by the Committee, while a member of a Chapter is a member of the Institute *ipso facto*, yet, on the contrary, a member of the Institute is not *ipso facto* a member of a Chapter.

Mr. PFEIFFER saw nothing in the Report to conflict with the action taken at Baltimore. He said that the By-Laws simply provided that a man could not become a member of the Institute if he had failed to comply with the By-Laws or with the regulations of the Chapter to which he had subscribed as a member; but a man who has paid all his dues and then resigns can become a Fellow or a member of the Institute without violating the amendment of the By-Laws passed at Baltimore.

Mr. MCARTHUR thought that the real difficulty was that there might be an antagonism between a Chapter and the Institute, and thought that any irregularity that should cause a member to cease to belong to a Chapter should also disqualify him from membership in the Institute.

The PRESIDENT requested the Secretary to read the By-Laws alluded to.

The SECRETARY read as follows: —

"No person who has for cause and in accordance with the Chapter and Institute By-Laws been dropped from the rolls of a Chapter, shall be eligible for re-admission or continuance as a member of the Institute without the consent of the Chapter from which he was dropped, signified in writing through their proper officers."

The PRESIDENT said that now the resolution read, "Fellows of the Institute are not necessarily members of the Chapters wherein they reside."

Mr. FREDERICK still thought there was ambiguity. He said he desired the Institute to come down as broadly as possible to the work of encouraging local Chapters, and not to throw barriers in the way of their advancement; but he objected to any man becoming a member of the Institute who was not qualified to become a member of any Chapter.

Mr. PFEIFFER said that very often pecuniary considerations obliged persons to choose between becoming members of a Chapter or of the Institute, as they could not afford to become both; and that in this view of the matter it was advisable to accept the proposed interpretation.

Mr. MCARTHUR said that he desired that a person should have perfect freedom in electing to become a member of a Chapter or of the Institute; but he thought it would be ruinous to the Chapters if a professional member who is dismissed from a Chapter for cause should be permitted to retain his standing in the Institute.

Mr. HUNT said that it was distinctly stated that if a member lost his standing in a Chapter for cause, he no longer belonged to the Institute.

Mr. FREDERICK said that if this were the interpretation of the By-Law it was all right. He thought also that a Chapter was just as much bound to drop a Fellow as an Associate.

Mr. PFEIFFER again said that he did not see any conflict between Chapters and the Institute suggested by the resolution. He thought that if a man had trouble with a Chapter, and if he had been dropped for non-payment of dues, and should make application to become a member of the Institute, the Board of Trustees would decline to consider his application. There was a By-Law which excluded him from becoming a member of the Institute, until he had settled his difficulties with the Chapter.

Mr. MCARTHUR said that if contrary to his understanding of the matter, the Board of Trustees was obliged to know whether a person was in good standing, he withdrew his objection.

Mr. FREDERICK asked why it was necessary to say that a Fellow of the Institute was not necessarily a Fellow of the local Chapter; and moved that the interpretation should be expunged.

The motion was lost, and the second interpretation was accepted by the Convention.

The PRESIDENT then read the third explanatory clause of the Report as follows: "It is recommended to the Chapters to admit junior members coming to them with letters from other Chapters, without exacting any fee."

Mr. PFEIFFER wished before the third interpretation was adopted, to move that a second item should be adopted as the expression of the Convention; inasmuch as the vote just passed was merely a vote negativing a motion to strike out the second recommendation.

The motion was adopted on a division; eleven in the affirmative, and eight in the negative.

The PRESIDENT said he thought the third recommendation should be considered as a new By-Law, as he did not remember that it was in the existing By-Laws. He however asked if the members were ready for the discussion, and repeated the recommendation, — that the Chapters should admit without admission fees junior members who came to them with letters from Chapters to which they had belonged.

Mr. MCARTHUR offered as an amendment, that all members resident within the jurisdiction of a Chapter should become members of a Chapter.

Mr. FREDERICK thought the recommendation of the Committee was right as it was, while he wished that Mr. McArthur would introduce his suggestion not as an amendment, but as a separate article for the consideration of the Convention.

Mr. MCARTHUR said he would suggest as an additional article, that the Institute recommend to all resident members where there is a Chapter, that they should join the same; and the Convention agreed thereto.

The third recommendation of the Committee, in regard to the admission of junior members of other Chapters, now became number four, and was adopted by the Convention.

The Report of the Secretary for Foreign Correspondence was then read by the Secretary of the Convention as follows.

[See Appendix L.]

The Report was entered upon the minutes.

The PRESIDENT stated that Mr. Cluss of Washington had a paper to read.

Mr. Cluss read a paper on "Architecture and Architects at the Capital of the United States."

[See Appendix M.]

A vote of thanks was tendered to Mr. Cluss for his paper.

Mr. STONE said that in view of the statement made by Mr. Cluss in regard to the Washington Monument,

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he was tempted to offer a resolution in regard to continuing the work thereon. He wished it to go forth that the American Institute of Architects condemned any contribution of money for the continuation of work thereon, as he thought it a disgrace to Americans that the work should go on. He wished to offer the following resolutions: —

Inasmuch as the original design of the Washington Monument is unworthy of erection as a representative of the spirit of architecture of the age, —

Therefore it is resolved by the American Institute of Architects, —

First, That the completion of the Monument on the original plan or any modification thereof is to be deprecated.

Second, That a Committee be appointed to confer with the proper officers at Washington, to prevent any further expenditure upon the work.

Third, In case of failure to effect a stoppage of the work, that they issue an address to the citizens of the United States, advising the withholding of contributions to the same.

The resolution was seconded.

Mr. McARTHUR thought that as the Government had referred the completion of the Monument to a committee of engineers, it would be better to suspend action in the matter till that committee had reported.

Mr. FREDERICK said he agreed with what Mr. STONE had said, and that as far as the Monument was concerned he thought it unworthy of the American people, but he did not think it the duty of the American Institute of Architects to advise the people what to give and what not to give. He thought the Institute would discharge its whole duty if it recommended the United States Government to discontinue the erection of the Monument, and let it be known that the Institute did not think it a proper representative of art.

Mr. LONGFELLOW said he deprecated any hasty action in the matter, and thought the resolution ought to be draughted with great care.

The resolution was finally referred to a committee composed of Messrs Stone, Wight, and Longfellow, as the time for adjournment was now near at hand.

The PRESIDENT having stated that the members would find lunch awaiting them in the same room as on the preceding day, declared that the Convention stood adjourned.

AFTERNOON SESSION.

The Convention was called to order at two o'clock, and began the consideration of the proposed amendments to the By-Laws. The first amendment considered was Article I., Section 2, to be altered to read, "Fellows of the Institute shall be such practising architects as shall upon nomination of two Fellows be elected by the Board of Trustees.

"The name and residence of every candidate, with information in regard to his professional education and length of practice, shall be forwarded to the Secretary, together with drawings or photographs and specifications of a proposed or executed building, accompanied by a written statement that the works represented are the original design of the candidate.

"Upon his nomination the Secretary shall send to every Fellow a circular containing the name and residence of the candidate, and the names of his proposers.

"If a Fellow shall be possessed of any information regarding the candidate, it shall be his duty to immediately state it in writing, under his signature, to the Board of Trustees. At any meeting of the Trustees held not less than thirty days after the date of the issuing of the circular, it shall be in order for them to consider all communications in reference to the person proposed, to make careful examinations as to his qualifications, and to proceed to ballot for his admission.

"Any candidate who shall receive three-fifths of the votes cast, not being less than five votes, shall be declared elected."

Mr. PFEIFFER. — The suggestion of this amendment I believe was mine. I spoke of it to the Board of Trustees, and the Board of Trustees seemed to approve the idea. My reason for it is this: we usually nominate a candidate who has made application for membership, and it has been the practice of the Board of Trustees to avail themselves of every opportunity to obtain information in regard to him before we nominate him as a member to be voted for by the other Fellows; and notwithstanding all the precaution we have taken in order to prevent the election of a candidate unworthy of membership with the Fellows, we have found that we cannot always be successful in so doing; and we have also found when we sent out the ballots, that it seems to be taken for granted by a majority of the Fellows that a candidate nominated by the Board of Trustees is such that his character and standing in the profession must make him worthy to be a member. There are a few cases in which serious objections have been urged by some members of the Institute against candidates who have been elected, and it has caused a great deal of dissatisfaction. Now, in order that the Board of Trustees can be more guarded in their actions, by being more fully informed as to the character of any candidate who may present himself for election, it occurred to me that if an opportunity were afforded to every Fellow to raise any objection he might have to the election of a candidate, such a Fellow could explain his objections, and give the Board of Trustees all the information in his possession. Then, after careful examination, we could say whether such objection would be sufficient to reject the candidate. This would place it in the power of the Board of Trustees to have a better examination of the claims of a candidate than it can have at present, and the Fellows would be better prepared to elect only members worthy of being taken into the Institute. Therefore it was thought best that these amendments should be presented to the consideration of the Convention.

Mr. SIMS approved of the amendment, and said that if it had been in force during the past year, the Board of Trustees would not have elected as member, in opposition to the unanimous protest of the Philadelphia Chapter, a person proposed by a member living outside of Philadelphia.

Mr. LITTELL thought that cases similar to those that had recently taken place would occur again, and that to obviate the possibility of such occurrence, the consent of the Chapter or the two Chapters nearest the residence of the applicant should be obtained by the Board of Trustees before it should authorize a ballot.

Mr. McARTHUR agreed with Mr. Sims. He did not desire to compel a practising architect to become a member of a Chapter, but he hoped that the consent of the Chapter nearest the residence of the applicant might be obtained before he was admitted as a Fellow. Those who lived in his neighborhood, who daily came in contact with him in his business, were better judges of who he was, and what he was, and what was his standing, than any foreign Chapters. He had considered the question before, and held that before any man should receive admission into the Institute he should have the consent of a majority of the Chapter nearest his immediate residence.

Mr. FREDERICK suggested that the votes of a fixed number of Fellows should be required to nominate a candidate for membership, — say, for instance, five Fellows; but if that were considered too much, he was willing to make it three, which would be a majority of a Chapter, and let that three control the vote.

Mr. HUNT thought that a very wise suggestion; because, after all, every one was anxious to have the numbers increased, and it seemed to him that it was impossible for the Board of Trustees to get satisfactory accounts of a great many names that were brought before them. In most cases, the persons most competent to give information upon such a subject were those belonging to the Chapters in whose vicinity the candidates resided; and therefore he was willing to assume the responsibility of stating that the suggestion of Mr. Frederick would be agreeable to the Board of Trustees.

Mr. LITTELL said that the Board of Trustees had better facilities for getting at information in regard to candidates from all parts of the Union than perhaps the Chapters had; and therefore the Board of Trustees should have the power of securing that information.

Mr. FREDERICK said that any local Chapter had a right to elect Associates, without any reference to the Board of Trustees; or they could be elected by the American Institute under existing laws; but the object of this amendment was to do away with the voting of the Chapters on a local candidate, and let that election be by the Board of Trustees.

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Mr. PFEIFFER said that experience showed that it was usually taken for granted that a person recommended and nominated for ballot by the Board of Trustees was considered by it a proper person for membership; and it often came to light after the ballots had been received, that some Fellow of the Institute had been in possession of information all the time which if known would have prevented the election of the candidate. The real purport of this amendment was to enable Fellows to submit such information to the Board of Trustees before the ballot was ordered.

Mr. FREDERICK proposed to amend the section under discussion as follows: "Upon his nomination the Secretary shall send to every Fellow and every Chapter a circular containing the name and residence of the candidate and the names of his proposers. If a Fellow or Chapter shall be possessed of any information regarding the candidate, it shall be his duty to immediately state it in writing, under his signature, to the Board of Trustees." The amendment was adopted.

Mr. MCARTHUR desired that in these rules should be incorporated a provision that the unanimous verdict of a Chapter of the city in which the candidate is located, either for or against him, should be considered final by the Board of Trustees.

Mr. LITTELL desired that the provision should read as follows: "The consent of the Chapter nearest the candidate shall be necessary before he can be balloted for by the Board of Trustees."

Mr. HUNT thought it should be the unanimous consent of any Chapter.

After some further debate, Mr. HUNT submitted the following amendment: —

"Should the unanimous opinion or verdict of any Chapter be adverse to any candidate proposed for membership, residing within the limits under the jurisdiction of said Chapter, the same opinion shall be considered as binding upon the Board of Trustees in this matter."

This would give to a Chapter the control of the vote over any professional man within its limits who might be a candidate, and it would leave the matter regarding any man living outside of its limits.

The amendment was adopted, and the section as amended was passed in the following form: —

Should the unanimous opinion or verdict of any Chapter be adverse to any candidate proposed for membership to the Institute, residing within the limits under the jurisdiction of said Chapter, the same shall be considered as binding upon the Board of Trustees in this matter.

Article I., Section 1. Fellows of the Institute shall be such practising Architects as shall upon nomination by two Fellows be elected by the Board of Trustees.

The name and residence of every candidate, with information in regard to his professional education and length of practice, shall be forwarded to the Secretary, together with drawings or photographs and specifications of a proposed or executed building, accompanied by a written statement that the works represented are the original design of the candidate.

Upon his nomination, the Secretary shall send to every Fellow and every Chapter a circular containing the name and residence of the candidate, and the names of his proposers.

If a Fellow or Chapter shall be possessed of any information regarding the candidate, it shall be his or their duty to immediately state it in writing under his or their signature to the Board of Trustees.

At any meeting of the Trustees held not less than thirty days after the date of the issuing of the circular, it shall be in order for them to consider all communications in reference to the person proposed, to make careful examination as to his qualifications, and to proceed to ballot for his admission.

Any candidate who shall receive three-fifths of the votes cast, not being less than five votes, shall be declared elected.

The PRESIDENT said that the next amendment was Article II., Section 2; the third sentence to be struck out, and replaced by the following sentences: —

"The annual dues of Fellows and Associates who are not members of Chapters shall be, for Fellows, twenty dollars, and for Associates, ten dollars.

"The annual dues of Fellows and Associates who are members of Chapters in good standing shall be, for Fellows, ten dollars, and for Associates, five dollars."

Mr. STONE stated that the matter of the expenses for the ensuing year had been referred to a committee which would report during the afternoon; and proposed that further action on the proposed amendment should be deferred till after this report had been presented.

It was agreed that action on the amendment should be so postponed.

The Report of the Committee on Nominations was next in order; and the list prepared by the Committee was read.

Mr. Van Brunt, as Secretary for Foreign Correspondence, having sent a positive refusal of the use of his name, Mr. Wight's name was presented in his place.

Mr. WIGHT wished to say before the ballots were cast, that though he appreciated very highly his nomination as Secretary of Foreign Correspondence he was compelled to decline that office. He thought that being situated at such a distance from the headquarters of the Institute, he could not be as useful as he ought; and he therefore suggested that the name of Mr. John H. Sturgis of Boston should be substituted in place of his own.

It was voted that the Secretary should cast a representative ballot for the Institute.

The SECRETARY asked whether he should name Mr. Wight or Mr. Sturgis as Secretary for Foreign Correspondence.

Mr. WIGHT said he positively declined election.

Mr. STURGIS then moved that the ballots be taken in the regular way.

On the motion of Mr. HUNT it was voted that a committee should be appointed to express the regrets of the Convention at the resignation offered by the President, Mr. Richard Upjohn. On the motion of the SECRETARY it was voted that this committee should be composed of one member from each Chapter.

Accordingly Messrs. Hunt of New York, Sturgis of Boston, Walter of Philadelphia, Wight of Chicago, Lind of Baltimore, Fuller of Albany, Morse of Providence, and Nash of Cincinnati, were appointed as this committee.

As the Convention agreed to the request of Mr. Sturgis, the tellers proceeded to take the votes of the members.

Mr. PFEIFFER. — I notice in the reports submitted to us by the Special Committee of Messrs. Longfellow, McArthur, and Stone, that something is mentioned about some drawings that were to be given to the Institute by Mr. Latrobe of Baltimore.

The report says, —

"Not long ago Mr. H. B. Latrobe of Baltimore wrote privately to the Chairman of this Committee, to ask advice concerning certain original drawings by his father, the first architect of the National Capitol, which he and his brother were disposed to present to the Institute if they would be received with interest, and cared for. The only answer which the Chairman felt justified in making was, that the future action of the Institute was very uncertain, and that possibly it might soon be without any place where it could keep Mr. Latrobe's drawings if they were presented."

For one, I am sorry that such an answer was given. As long as the Institute had a home at the time, and a place where these drawings might have been received, I think that they should have been accepted with the thanks of the Institute, and that we should have tried to care for them. Even now, if it is possible to retrace this step, I think it would be desirable to do it; and I therefore move that the Chairman of this Committee be requested to communicate with Mr. Latrobe, and say that a home for the Institute is secured, and we should be glad to receive from him the present which he had so kindly tendered.

The motion was agreed to. On the motion of Mr. LITTELL the thanks of the Convention were tendered to the Philadelphia Chapter for the hospitality with which it had been entertained.

The PRESIDENT requested Mr. Ware to read the Report of the Committee on Professional Practice while the tellers were preparing their returns.

Mr. WARE said that the report of the Committee on Education was sufficient work for one man, and therefore the Committee on Professional Practice presented only the abstract of a projected Tract on Competition already printed.

Mr. SIMS moved that the amendment suggested by the Chicago Chapter be discussed.

Mr. LONGFELLOW said that as the Report of the Committee on Finance was ready, this had better be received before the amendment proposed by the Chicago Chapter was considered.

The PRESIDENT said that the reading of the Report must precede the consideration of the amendment.

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Mr. LONGFELLOW. — The Committee on Finance was appointed in pursuance of a suggestion of the Committee on Inspection and Advice, to the effect that an estimating Committee be appointed at each Convention, to estimate the expenses for the ensuing year. The Committee on Finance have made the best estimate they could upon the short notice they have had; and they must ask the indulgence of the Institute, because of the little time at their command, and the entire novelty of the experiment. It is a question at best, whether such an estimate can be any thing more than an approximate one; but such as it is, they offer it.

ESTIMATE OF EXPENSES FOR 1877.

Treasurer's expenses		$200 00
Secretary's expenses		500 00
PUBLICATION COMMITTEE.		
Editing	$50 00	
Clerical and printing	250 00	
		300 00
CONVENTION EXPENSES.		
Reporting	$50 00	
Clerical and printing	150 00	
		200 00
ROOM.		
Rent	$350 00	
Care and messenger	103 72	
		453 72
Contingent		100 00
		$1,753 72

The report was accepted.

Mr. WIGHT. — On what present membership is the estimate of income based?

Mr. LONGFELLOW. — $2,200 at the present rate of taxation; which is for seventy-one Fellows at twenty dollars, $1,420, and for eighty Associates at ten dollars, $800, — making $2,200. The Committee at first had in mind to suggest for this year a reduction of the assessments to the amount of sixteen dollars for Fellows, and eight dollars for Associates, which would yield the Institute $1,776 in place of $2,200; but on further consideration and consultation with the Treasurer, the Committee considered that it was unsafe for them to recommend such an experiment for this year, especially as certain changes in the method of collecting the dues have been already proposed; and they therefore submit the report which I have read.

Mr. STONE moved that further discussion of this amendment might be postponed till after the delivery of the closing address. He hoped that members would remain after the delivery of the address, for the purpose of discussing this matter which he considered a matter of vital importance. No one would be more glad to reduce the dues than the Committee on Finances, to whom the only practicable way of so doing was to increase the membership.

Mr. PFEIFFER desired to mention before the delivery of the closing address a matter which press of other business had thitherto prevented his bringing forward as requested to do by a gentleman of New York, — the establishment of courts of arbitration between clients, builders, and architects; as he was himself obliged to leave to fulfil an important engagement, he would leave his papers with the Secretary.

The Rev. E. L. MAGOON, D.D., was then introduced to the Convention by the President, and delivered the closing address. [See Appendix.]

On motion of the Secretary the thanks of the Convention were voted to Dr. Magoon for his address.

In acknowledging the vote of thanks Dr. Magoon mentioned that his life-long interest in architecture had led him to make in England a collection of more than nine hundred architectural drawings. These he had presented to the library of Vassar College, and he cordially invited any member of the Institute who might visit Poughkeepsie to use his name as an introduction to the librarian.

The SECRETARY said that the tellers were ready to report.

The report of the tellers was read by the Secretary, announcing the following elections: —

President, Mr. Thomas U. Walter; *Trustees*, Messrs. Dudley, Pfeiffer, Haight, and R. M. Upjohn; *Treasurer*, Mr. R. G. Hatfield; *Secretary*, Mr. A. J. Bloor; *Foreign Secretary*, Mr. P. B. Wight; *Committee on Education*, Messrs. Pfeiffer, Nash, Lind, Thorn, and Stone; *Committee on Publications*, Messrs. Littell, Bloor, Harney, Longfellow, and Hartwell.

The SECRETARY. — I was requested by Mr. Pfeiffer to bring before the Institute, in order to get an expression of its opinion upon the subject, a plan for the organization of a system of conciliation and arbitration in disputes arising from building-operations which have been brought before the New York Chapter as a local matter. What I now read has been signed by fifty-four of the architects of New York, including most of the New York gentlemen who are in this room.

"The undersigned, having duly considered the fact that, owing to the delays of courts in matters of dispute arising from and connected with building-operations, great inconvenience, pecuniary and otherwise, is experienced by the community, and believing that in the majority of cases such disputes might be amicably and promptly adjusted by a Board of Conciliation or Arbitration composed of disinterested building-experts, hereby express their desire to see such a Board properly organized."

Mr. MCARTHUR thought that so far as Philadelphia was concerned, the method set forth in the paper would not differ from an action at law; and he was in favor of leaving people to choose their own architects in each case.

It was voted that the papers should be laid upon the table.

The amendment suggested by the executive committee of the Chicago Chapter was then taken up. It read as follows: "Article II., Section 2; the third sentence to be struck out, and replaced by the following sentences: —

"The annual dues of Fellows and Associates who are not members of Chapters shall be for Fellows twenty dollars, and for Associates ten dollars.

"The annual dues of Fellows and Associates who are members of Chapters in good standing shall be for Fellows ten dollars, and for Associates five dollars."

The SECRETARY moved that the amendment be referred to the Committee on Finance.

Mr. LONGFELLOW said that at the lowest calculation the adoption of this amendment would reduce the income of the Institute by at least $750. The income of the Institute had averaged $2,200, and the lowest estimate that the Committee on Finances had been able to make for the following year was $1,750, while by adopting the amendment the income would fall $250 below even this estimate.

Mr. STONE said that there were about 130 members, Fellows and Associates. He saw no remedy for the financial condition of the Institute but an increase of membership. The committee had cut down the expenses as closely as possible. He thought that all members wished to receive printed circulars in regard to the Conventions, as well as to have a Secretary and a Treasurer. If the membership did not diminish, the dues might be reduced to eight dollars for Associates and sixteen dollars for Fellows, provided every member paid his dues. But he thought that this would be steering too close to the estimate. It would be better to continue the present rates during the coming year, and reduce the rates for the next year provided the close of the year left a surplus in the treasury. He moved that the amendment proposed by the Chicago Chapter should be postponed for one year.

A motion that the question be put without further discussion was lost.

Mr. WIGHT thought that Mr. Longfellow's calculation which showed that if the amendment were adopted there would be a deficit of $250, was not a fair calculation, inasmuch as the probable increase of members was not taken into consideration. To make good this deficit, it would only be necessary to acquire five new Fellows and fifteen new Associates; and he looked to this reduction to enable a much larger number to join the Institute who were now prevented from so doing by the high dues demanded, so that within a year, so far from having reduced the income, the amendment would have increased it. If the amendment should be adopted he would guarantee that membership of the Chicago Chapter would be doubled within the year. Experience had shown him that members usually regarded the Chapter

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as the only tangible thing in the Institute; and reducing the fees would increase the membership of the Chapters, and thus secure good men who ought to be members of the Institute. If members would only look at the matter squarely, they would see that now was the proper time to make a reduction, and so enable young men, who were eventually to become its best members, to join the Institute.

Mr. WARE said that what Mr. Wight had said recalled what had often been said in the Boston Chapter, that what was due to the Institute was an almost intolerable burden. He said, "It seems to me the only thing to do in this case, if the experiment which Mr. Wight urges so enthusiastically is to be tried, is to lay an anchor to windward, and have a guaranty which will protect the Institute against loss at the end of the year if there is a deficiency in our receipts. I for one will be willing to contribute what I can to provide a guaranty of five hundred dollars; and I think in the course of a few moments we could raise a fund to that extent to be drawn upon *pro rata* from those who subscribe to it, if at the end of the year it may be found necessary to do so. If that is done, then the experiment which some of us are so anxious to try could be tried without the slightest risk to any one; and if our receipts fall below our expenses, we shall be in a condition to receive no injury from the fact."

Mr. HATFIELD thought there would be no impropriety in distinguishing in the payment of dues between those who were members of Chapters and those who were not, by adopting a rule that would oblige the latter to pay the largest dues. The only method by which the Institution could be relieved was that suggested by Mr. Stone, — an increase of membership. He thought it the true policy of the Institute to make the entrance into the Institute as easy as possible. He was in favor of any reform or any reduction of fees that could be proposed, but did not see that the proposition before them was practicable at present.

Mr. MCARTHUR said that he was one of a committee appointed at the last Convention to look into the financial matters of the Institute, which after a thorough investigation was much surprised that the Secretary and Treasurer could accomplish so much for so little money. He thought he expressed the sentiments of his colleagues when he said that they were favorable to reducing the expenses of the Institute, but how it was to be done they were unable to determine. He said, —

"Mr. Hatfield, I think, striks the key-note in his suggestion of an increase of membership; but you may rely upon it that as long as the dues are kept at their present high figure you will not get an increase of membership. Our high dues stand in our way in the city of Philadelphia, and I presume they stand in the way of all other Chapters. Our dues are a grievous burden, and for myself individually I am fully convinced that the experiment is worthy a trial, and that with a reduction of the fees a larger membership could reasonably be expected. I have myself before that Committee advocated most strenuously instead of a reduction of expenditure, a greater expenditure. I have recommended the making of more investments in the hope of a large return; and I think that so long as this voluntary system of service is continued, where the Secretary and Treasurer remain in office without any direct and specific remuneration, the Institute cannot expect that return which it would if it gave such a man as the Secretary of this American Institute ought to be, a proper salary, and sent him out on missionary work. The Secretary should be allowed to go forward with the instructions of this Institute to organize Chapters throughout the entire length and breadth of the land; for unless some personal interest is brought to bear upon the individual architects throughout the country, all the papers that are put in circulation amount to just about so much waste paper."

Mr. LONGFELLOW said that all were bent upon the same end, but it rested with those who proposed the reduction to show how the expenses of the Institute could be cut down. If it was voted to reduce the dues, it ought also to be decided what of the expenses should be given up. But the Convention had already taken the other tack: it had recommended that an estima each year's expenses should be prepared, and that annual assessments should be graduated in accorda with this estimate. Such an estimate had been p pared and accepted, and to pass the amendment witho undoing what had been done would be to nullify tl action of the Convention.

Moreover, if this amendment were passed it not be undone except by another amendment pr in due form, and acted on a year in advance. If therefore it were necessary to try such an experiment as the brethren in Chicago wish tried, it should be an experiment and nothing else, and should be done this year by a simple resolution remitting a certain portion of the dues, and not committing the Institute for a period indefinite in the future. Therefore he moved that the Chicago amendment should be laid on the table with the hope that some temporary motion might take its place so that the experiment might be made for one year before taking a step which, should it prove disastrous, would be difficult to retrace.

The motion was lost.

Mr. FREDERICK moved that the proposed amendment be so amended as to make the annual dues seven and a half dollars for all Associates, and ten dollars for all Fellows. Mr. Frederick's amendment was adopted, and the amendment to the By-Laws was then passed as follows: —

"Article II., Section 1; the third sentence to be struck out, and replaced by the following sentence:—

"The annual dues of Fellows and Associates shall be for Fellows fifteen dollars, and for Associates seven and a half dollars."

Mr. WARE called attention to a recommendation which had been made, that the Trustees should transact as much of their business as possible at quarterly meetings, so as to suit the attendance of the President and those members of the Board who did not reside in New York. The recommendation was agreed to.

The Auditing Committee then reported that they had audited the Treasurer's accounts and found them correct, but that the discrepancy between the Convention year and the fiscal year made it desirable to continue their examination further than could be done at that time. They requested leave to report to the Trustees after the adjournment of the Convention. The report was accepted, and the permission accorded.

The Committee appointed to prepare resolutions concerning the Washington Monument reported the following: —

"Inasmuch as the original design of the Washington Monument is unworthy of the spirit of the architecture of an enlightened and civilized people, it is

"Resolved by the American Institute of Architects, as assembled in Convention in Philadelphia: —

"1st, That the completion of the said Monument on the original plan, or upon the plan now proposed for the same, is to be deprecated.

"2d, That there be a Committee of the American Institute of Architects to confer with the Commission which has been charged with the completion of the Monument, and that the Committee be instructed to recommend that if it be completed the Commission shall, so far as in their power, further the selection of some different and suitable design to which it may be made to conform."

The resolutions were adopted, and the President appointed as the committee Messrs. McArthur, Longfellow, and Potter.

On motion of Mr. Hartwell it was recommended to the Board of Trustees that the Convention of 1877 should be held in Boston.

The PRESIDENT. — Nothing more being before the Convention, you will allow me to congratulate you, gentlemen of the American Institute of Architects, upon the harmony and good-feeling which has characterized this Convention, and for the interest in the proceedings of this body which you have manifested. I hope we will all carry with us to our various Chapters the same spirit of good-will and the same interest in our future prosperity. And as we are now ready to adjourn *sine die*, in the name of the Philadelphia Chapter I bid you good-by.

The Convention then adjourned *sine die*.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

(SUPPLEMENT.)

TENTH ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS, HELD AT PHILADELPHIA, PENN., OCT. 11 AND 12, 1876.

REPORTS SUBMITTED TO THE CONVENTION.

REPORT OF THE BOARD OF TRUSTEES.

OCT. 11, 1876.

To the American Institute of Architects.

Your Board of Trustees respectfully report that since the Convention in Baltimore last year they have held fourteen meetings.

They beg to ask your consideration for the two sets of proposed amendments to the By-Laws now before you, representing as they do two of the subjects which have mainly been pressed on the attention of your Board during the year. One of the documents refers to the important topic of finance, the other to its inseparable subject of membership. The amendment offered by the Executive Committee of the Chicago Chapter for a reduction of membership dues — and which you will presently find enlarged upon in the Annual Report of that Chapter — has been mooted in other Chapters as well, and particularly in that of Boston; and it was with a view to elucidating the question that your Board at the last Convention recommended the formation of a Special Committee of Inspection. The suggestion was adopted by the Institute; and such a committee, enlarged into one of advice as well as of investigation, was appointed, with instructions to report by circular to the professional members of the Institute. That committee has not, however, found it possible as yet to do so, but will doubtless materially assist your deliberations in the convention now opened. Your Board suggests as their contribution to the discussion which is likely to arise on the foundational subject of ways and means, that a large saving in annual expenses may be effected by dispensing with the annual proceedings of the Conventions in their present form, and by handing over the materials to the editor of the organ of the Institute, the *American Architect and Building News*, for publication. Another step in the direction of economy has been practised by the Committee of Arrangements of this Convention, at the suggestion of the Chapter under whose auspices we now meet; and that is in foregoing the usual annual dinner and lunches. And the same Chapter in a recent communication to your Board records a resolution adopted by it which recommends that the granting of any appropriation for this purpose be abolished altogether. Whether with or without the reduction of dues, there is the more reason to take seriously to heart the question of legitimate modes for lessening expenses, inasmuch as there is necessarily a constant increase in the drain upon the treasury to meet the current outlays of the administration of the Institute. Some idea of the work done in the course of this administration may be found in the fact that during the eleven (11) months that have elapsed since the last Convention, as shown by the Secretary's press copy book, he has written two hundred and seventy (270) letters, either in autograph or in draught for the use of the copyist, about fifty (50) of them being from two (2) to half a dozen pages long. These do not include notices of meetings, transcripts of minutes, or notes on minor current business. Of such no copies are kept. If duplicates are added, the figures reach to eight hundred and thirty-seven (837) letters.

The question of finance and of membership are under many aspects interchangeable; and the proposition for such a change in the By-Laws as should add to the existing power of the Trustees to elect Associates, that of electing Fellows as well, is submitted to you by your Board, not with any personal desire to increase its authority, but with a view to eliciting the enlightenment and instructions they hope to have from you during this Convention. The minutes of the transactions of your Board, since the last Convention, are to an unusual degree occupied with questions relating to membership. The action of your Board and your Secretary in the matters of nominating, issuing ballots for, and admitting members, as well as in rejecting applications or in defining the By-Laws on the subject of candidateship, has been questioned and criticised by members of the Institute. Questions of the status of old members of the Institute in relation to the Chapters in their locality — brought to your attention at your last Convention by the Baltimore Chapter — have since constantly been laid before your Board. In consequence of the pressure your Board has felt in relation to the points indicated, it passed some time since a resolution that the question of the status within the Institute of parties whose relations to the Institute appear to involve anomalous conditions as regards the Chapters in their localities, or otherwise, be referred to the next (that is the present) Convention.

Your Secretary has been and is in correspondence with architects in several important centres of the Union, with a view to the formation of Chapters; in one case the application for the admission of more than the necessary number of Fellows having been made. But fruition is delayed until a harmony of different interests as to finance and membership can be established. The solving of the problems presented to your Board will largely depend on the light you may throw on these vexed questions in the course of this Convention, and on the understanding which your Board may derive as to the liberty to be allowed to it in the matter of the application of the By-Laws under the various exigencies presented to it by the widely varying conditions of our extensive territory.

So far during the current fiscal year, the membership has been increased by four (4) Fellows, ten (10) Associates, two (2) Honorary and two (2) Corresponding members, while one (1) Fellow, having abandoned the profession of architecture for that of engineering, has resigned. One (1) Associate, an engineer, has been transferred to Corresponding Membership; and one (1) Associate, Mr. Edwin L. Howland, just previously elected a practising member of the Rhode Island Chapter has died — on intelligence of which your Board transmitted a resolution of condolence to his Chapter.

At our last Convention the draught of a formula for a general building-contract presented by your Board was discussed at much length; a number of amendments were offered, and the matter was referred back to your Board, who intrusted the subject to the consideration of a special committee of one, Mr. Haight, with instructions to report on it. In due time he reported that the suggestions received from the different Chapters had been carefully examined, that in large part they had been adopted, and with the assistance of counsel the original draught of contract had been revised and was presented for adoption. Mr. Haight's report and accompanying draught were accepted, and will be laid before you in the course of this Convention.

A case involving questions of interest to architectural practitioners — that of the New York State Capitol — has been brought to the attention of your Board, but was referred by it to the New York Chapter. After action by that Chapter, documents connected with the case were referred, as being of general and not merely local interest, to the Institute, including indorsements of the action of the New York Chapter by the Chicago, Philadelphia, and Rhode Island Chapters, and commendatory letters from Lord Monk, Governor-General of Canada, and other officials, giving the facts of the connection of Mr. Thomas Fuller, the architect of the New York Capitol, with the Government Buildings of the Dominion.

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Some two months since, your Board received a communication from Mr. W. P. P. Longfellow, suggesting that they take some action on the part of the Institute in the way of protesting against the completion of the Washington Monument at the capital according to its present designs; but as the Government simultaneously took action on the subject by referring it to a commission, your Board found no opportunity to attempt any thing in the matter.

Your Board has been requested by the Baltimore Chapter, under a resolution of that body, to have all the papers read at the annual conventions published and distributed to the members of the Institute. So far as the question involves literary points of interest to the profession, your Board necessarily left the subject to the Committee on Publications; but as regards the point of expenditure, the action of the Baltimore Chapter was referred by your Board to this Convention.

Your Secretary has been authorized to furnish to the editor of the *American Architect and Building News*, copies of the minutes of your Board and other documents in his discretion.

The American Society of Civil Engineers invited members of the Institute to participate in its recent annual meeting, and to use its rooms and appliances at Philadelphia during the Centennial Exhibition. Your Board expressed the thanks of the Institute to your sister society for its courteous invitation, and your Secretary transmitted it to each professional member of the Institute.

Your Board issued communications to each Chapter, suggesting its participation in the Centennial Exhibition by a display of illustrations of the professional works of its members. The response was not so general as might reasonably have been hoped for. As far as your Board has been informed, only two of the Chapters, those in Boston and New York, acted collectively and officially in the matter.

The Austrian Society of Engineers and Architects in Vienna have profferred to the Institute — as a sign of professional consideration and international friendship — a collection of drawings, plans, and photographs representing inventions, works, or buildings projected or executed by members of their Society. The offer was cordially accepted by the Board on behalf of the Institute; and the correspondence on the subject was referred to the Secretary for Foreign Correspondence, Mr. Van Brunt.

A question having been put by a member of the Institute temporarily engaged as agent for an industry connected with building-operations, your Board, after discussions on the subject in its different bearings, passed a resolution that they see no impropriety in an architect accepting an agency, provided his clients are informed of the fact, if his agency should cover any material under discussion for use in their premises; and your Secretary was instructed to transmit the resolution to the inquirer, which was done.

The efforts made by the Board toward the establishment of a proper architectural service for the National Government, and which in the shape of a bill to be presented to Congress engaged your attention at the last Convention, have so far been without public result. The bill, after many amendments by committee to whom it was referred, was presented to and acted upon by Congress, and referred to the House Committee on Public Buildings and Grounds, where it has since rested along with another bill of the same nature presented by the then Supervising Architect of the Treasury Department.

Respectfully submitted.

RICHARD UPJOHN, *President*,
R. M. HUNT, *Vice-President*,
THOS. U. WALTER, "
P. B. WIGHT, "
A. C. NASH, "
EDWARD C. CABOT, "
E. G. LIND, "
THOS. FULLER, "
ALPHEUS C. MORSE, "
R. G. HATFIELD, *Treasurer*,
A. J. BLOOR, *Secretary*,
HENRY VAN BRUNT, *Sec. For. Cor.*,
HENRY DUDLEY,
CARL PFEIFFER,
C. C. HAIGHT,
R. M. UPJOHN,

Board of Trustees.

REPORT OF THE COMMITTEE ON PUBLICATIONS.

Oct. 10, 1876.

To the American Institute of Architects.

Your Committee on Publications for the year 1876, comprising Messrs. Littell, Bloor, Holly, Pfeiffer, and Hunt, respectfully report that they have held four (4) meetings since the last Convention, and have had the proceedings edited and published in the usual pamphlet form, but with less matter and consequently with less outlay than previously; such portions as were omitted having been referred with power to the editor of the *American Architect and Building News.*

Your Committee have no knowledge of the financial status and prospects of that periodical, on which of course its permanence will depend; but they regard its literary success as established, while its illustrations on the whole are not below what might be expected. If, therefore, it should be discovered on inquiry, that its commercial success is reasonably assured, your Committee would recommend that the publication of an annual pamphlet by this Institute be discontinued, and that the proceedings of the Annual Conventions, under such restrictions and guaranties as may appear proper to your Committee, be handed over to the editor of the *American Architect and Building News* for publication.

Your Committee respectfully invite the consideration of the Institute to the subject. As the *American Architect and Building News* is the adopted organ of the Institute, your Committee suggest that it might be valuable to have an expression of the understanding of the Convention as to how far the serial is to be considered its mouthpiece.

(*Last Paragraph of the above as amended in Convention.*)

Your Committee respectfully invite the consideration of the Institute to this subject. As the *American Architect and Building News* is the medium of publication of the Institute, your Committee suggest that it might be valuable to have an expression of the understanding of the Convention as to how extensively the proceedings of the Convention should be published therein.

REPORT OF THE NEW YORK CHAPTER.

NEW YORK, Oct. 10, 1876.

To the American Institute of Architects.

The New York Chapter respectfully submits the following report: —

During the official year of 1875–6 it has held eight (8) regular and four (4) special business meetings, with the usual social meetings between the regular business ones.

The Chapter took pains early in the year to present illustrations of the works of its members at the Centennial Exhibition. The result was achieved by a special committee, and in conjunction with the works of other members of the Institute is before you in one of the rooms of the Annex of the Art Department.

The subject of a controversy between the architect of the New York State Capitol now in progress of erection, and the so-called Advisory Board of Architects engaged by the State authorities to revise the said architect's plans, having been laid before the Chapter, a committee consisting of Messrs. Post, Dudley, and Robertson was appointed to report on the case. They did so in the form of a memorial to the State Legislature, which after some amendments was adopted by the Chapter, and in its finished form is hereto appended. The original was forwarded to the Albany Chapter for transmission to the State Senate, where, and afterwards in committee, it was debated. The document was widely published, and it was officially indorsed by the Chicago, Philadelphia, and Rhode Island Chapters. Mr. Fuller, the architect of the Capitol as well as of the well-known Gothic structures constituting the Government Buildings of Canada, forwarded to the Secretary copies of letters from the Governor-General, the Government Engineer, and the Speaker of the Senate of the Dominion, stating that Mr. Fuller had designed and supervised these buildings to their close and to the great satisfaction of the authorities. These and other documents, being of interest to the profession at large, were transferred by the Chapter to the Institute.

Propositions have been made to the Chapter looking toward the establishment of a Board of Concilation or

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Arbitration, composed of disinterested building-experts, in the matter of disputes arising from and connected with building-operations; and a statement expressing the desire of the signators for the establishment of such a board has been printed, and signed by fifty-four (54) architects of New York City. So far as the co-operation of the Chapter is concerned, the question has been laid on the table.

The Chapter had appointed a special committee to consider what provisions should be introduced into the building-law of the city of New York with reference to public health.

The subject of the introduction of the metric system into current practice having been presented to the Chapter by a committee of engineers in Boston, the subject was referred to a committee of one, Mr. Haight, who reported that in view of the public discussion on this subject, it is not desirable for the New York Chapter A. I. A. at the present time to take any definite action in the matter.

The attention of the Chapter having been called to certain articles in the *American Architect and Building News* in relation to the Congressional bills draughted by the Institute and the Supervising Architect of the Treasury Department, looking toward the regulation of the architectural service of the General Government, the following resolution was passed by the Chapter, and transmitted to the periodical mentioned: to wit, —

"*Resolved*, That the New York Chapter A. I. A. reaffirms the views expressed in the Fifth Annual Convention on the Institute held in Boston in 1871; viz., —

"'That the architect and author of the design of any proposed work should retain the supreme control and general supervision of the execution of the work.'"

The Chapter has presented to the Metropolitan Museum of Art, in New York, a collection of Central American pottery, &c., which it acquired by donation before the establishment of the Museum.

Mr. A. F. Oakey, practising member of the Chapter, read at one of its earlier meetings, an original paper on Acoustics, which was published in the *American Architect.*

Through the management of Mr. H. H. Holly, practising member, an interesting series of photographs illustrating recent work in England has been added at a nominal cost, to the collection of the Chapter by its Library Committee.

The Committee on Examinations of the Chapter has during the year, in conjunction with the Building Department, surveyed and reported on twenty-seven (27) buildings averred to be unsafe.

A list of the present members of the Chapter is hereto appended, together with one of the officers and standing committees elected at the annual meeting on the 3d inst.

Respectfully submitted.

A. J. BLOOR.
Secretary of the New York Chapter A. I. A.

REPORT OF THE CHICAGO CHAPTER.

SECRETARY'S OFFICE OF THE CHICAGO CHAPTER A.I.A.
90 LASALLE ST., CHICAGO, Oct. 2, 1876.

To the American Institute of Architects.

The Chicago Chapter respectfully submits its Annual Report for the year ending Oct. 2, 1876.

During the past year thirteen meetings have been held, and subjects of interest have been introduced, papers have been read, and discussions have ensued, which have made our meetings of value to the members in attendance.

Our Chapter has obtained a standing, and a recognition from the public, and its opinion has been sought by those interested in and connected with building-problems requiring an opinion and a solution. Subjects of construction, as well as the honorable practice of the profession, have been among the questions submitted.

The Chapter at a special meeting held Tuesday, Nov. 30, 1875, made amendments to its By-Laws relating to the annual contributions of its members.

The dues were reduced from forty and thirty dollars to twenty-five and fifteen dollars respectively for Fellows and Associates of the Institute, the Institute dues being included, thereby reducing the amount actually paid to the Chapter by each member per year to five dollars.

It is in this connection that the Chicago Chapter wishes to lay before the Institute the subject of the reduction of the Institute dues for their consideration, and desires some action tending to a reduction.

We find it a serious obstacle to our progress and strength, both in the loss of members, and the reluctance on the part of others to join us.

The Chapters forming the Institute without doubt prize their national confederation: yet each individual Chapter has its own work to perform, and must draw from its own members the vigor and strength requisite to a successful existence.

Chicago, next to New York, contains more architects than any other city in the Union: yet our Chapter is among the smallest of the Institute. There are numbers of young and promising architects in the city who could bring in with them a certain life and activity sadly needed in our Chapter; yet these hold aloof in consequence of the illy proportioned dues, which in their judgment they find it hard to harmonize with their available funds.

This is also the case with some of the older members of the profession, who would be induced to join the Chapter were not the payments objectionable to them.

We regret to report that we have already lost a few worthy members for no other reason than that named, and it is not unlikely our ranks will be still more reduced unless some amendment be passed.

We find upon examination of the Institute roll, that there are a few who are Fellows of the Institute yet are not members of any Chapter. We would suggest that if the reduction of the Institute dues be favorably considered, the dues of such members be left undisturbed, — still giving them the privilege of the reduction provided they become members of a Chapter, accordingly assisting in its support.

We have one member residing in an adjoining city, who has nobly stood by us though receiving no direct benefits from our meetings; and could we be favored with a reduction of the Institute charges, we have the material about us to form an active association, which when stronger in numbers will increase rather than diminish the amount now paid to the Institute.

We present this subject as one of importance, not only to our Chapter but to others of the Institute, and respectfully suggest its due consideration at the present Convention.

I have the honor to be respectfully

HENRY L. GAY,
Secretary of the Chicago Chapter A. I. A.

REPORT OF THE BALTIMORE CHAPTER.

BALTIMORE, October, 1876.

A. J. BLOOR, ESQ., *Secretary American Institute of Architects, New York City.*

Sir, — I have the honor to present to you the Annual Report of the Baltimore Chapter.

The regular meetings have been held, but poorly attended. Several interesting papers have been read during the year. The question of printing papers read before the Institute with the Annual Report was discussed, and a resolution to that effect was sent to the Board of Trustees requesting that this be done in the future. The committee on a proposed building-law for the city of Baltimore reported one which was presented to the City Council for action, and has been referred to a committee who have as yet made no report.

We have lost by resignation one of our most useful members, Mr. N. H. Hutton, Fellow, who was one of the founders of the Chapter, and at the time of his resignation, President.

Two members (Associates) have been added, — Messrs. J. B. Noel Wyatt and J. E. Sperry.

Very respectfully,
JOHN MURDOCH,
Secretary of the Baltimore Chapter A. I. A.

REPORT OF THE PHILADELPHIA CHAPTER.

PHILADELPHIA, Oct. 9, 1876.

As Secretary of the Chapter, it becomes my duty in accordance with the fourth section of Article XI. of the By-Laws to submit a report of our proceedings during the past year.

Our meetings have been regularly held fortnightly, except during the summer vacation; but no papers of importance have been presented. The intercourse of the

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members with each other at the meetings has tended to promote a confraternity of feeling throughout the Chapter, and in that way our profession has been measurably benefited.

Our membership is comparatively small, and, all being actively engaged in practice, it is difficult to maintain a very high degree of enthusiasm; we nevertheless find time and heart to keep up a working organization.

We take pleasure in welcoming the Convention to our city and our hospitalities. Our Chapter rooms are at all times at your service; and the Centennial Exposition offers attractions such as you will not find again in an American city for another hundred years.

All of which is respectfully submitted.

ALONZO B. JONES,
Secretary of the Philadelphia Chapter A. I. A.

REPORT OF THE RHODE ISLAND CHAPTER.

PROVIDENCE, October, 1876.

To the American Institute of Architects.

The Rhode Island Chapter respectfully submits its First Annual Report.

The Chapter was organized Nov. 10, 1875, and has since held sixteen meetings. After the necessary work of organization was completed, a rule was adopted that each member in alphabetical succession should present a topic for discussion. Under this system, the following subjects have been considered, either by formal papers or by oral discussion: —

I. The proper methods of obtaining bids, and awarding contracts.

II. The utility of a Mechanics' Exchange.

III. Notes of personal observation in Pompeii.

IV. The effect of concussion and vibration on artificial stone.

The Chapter engaged heartily in the movement for the introduction of the metric system into general use, but found the opposition to it so formidable that it was determined to await a more favorable opportunity for positive action.

By invitation of the City Government, the Chapter has commenced the preparation of a building-law for the city of Providence, which it is hoped will be ready for adoption by the proper authorities early this winter. As various circumstances have directed public attention to the utter inadequacy of the present law, as well as to the non-existence of any special means for enforcing even its meagre provisions, the requirements of which are openly disregarded in the heart of the city, it is possible that the proposed law may be passed without much difficulty; but however this may be, the Chapter intends to do its part, and if not rewarded with immediate success, will continue to urge the matter until a proper law is enacted and enforced.

The Chapter was formed with six members. It has admitted during the past year five professional and two junior members. It has lost one, Mr. Edwin L. Howland, who was removed by death on the 28th of June, at the age of thirty-eight. Mr. Howland was a man of sterling integrity, heartily devoted to his profession, and giving promise of attaining much distinction in it. Associated during the greater part of his professional life with others, his works since he began practice as a principal have been marked by a great increase in power of design and refinement of taste, until the latest of them, the Harrison-street Church and the Wilcox Building in Providence, and others, deserve to rank among the best works of this generation.

Mr. Howland has left a large number of churches, business buildings, and dwellings to testify to his ability; and in him the Chapter loses an efficient member, and the profession an upright and honorable practitioner.

The Chapter begins the new year in a sound financial condition, and encouraging prospects of influence and usefulness.

Respectfully submitted.

CHARLES P. HARTSHORN,
Secretary of the Rhode Island Chapter.

REPORT OF THE BOSTON CHAPTER.

BOSTON, Oct. 10, 1876.

To the American Institute of Architects.

The undersigned has the honor to present his annual report as Secretary of the Boston Chapter.

The monthly meetings of the Chapter have been held with the usual regularity on the evenings of the first Friday of each month from October to June, generally in the architectural rooms of the Institute of Technology. At the first meeting in October no quorum was present; at the other meetings, the attendance varied from nine to twenty-one. The activity of the previous year has perhaps not been quite sustained, but there has yet been no lack of interest at the meetings. Besides the ordinary local business of the Society, there have come up from time to time subjects of broader interest, provoking more animated discussions: such for instance as the conflicting action of the Institute and one of its Chapters, respecting the election as a Fellow of the Institute of a previous member of the Chapter, who had for cause been dropped from the Chapter rolls; the desirability of adopting the metric system of weights and measures; the subject of the money contributions of the Chapters to the central treasury; the representation of the work of the Society at the Centennial Exhibition; the controversy between the architect of the State Capitol at Albany and the Advisory Board; and other topics of similar interest.

These however were casual and occasional topics suggested by the events of the day in the life of the profession. It was felt as in previous years that our meetings should be marked by some more regular and prepared work which should justify us in feeling that the Society had not merely a formal existence, but that it was capable of exercising an active educational influence, first on its own members, second on those students and draughtsmen within its reach, and third to some extent on the public. Accordingly the Committee on Providing Business and Entertainment reported early in the year a scheme for a series of discussions at the meetings on subjects connected with the practical or constructive part of the profession, — such as Foundations, Masonry, Framing, Roofing, Steam-heating, Plumbing, and the like, — and also for a series of lectures of an informal character to be delivered in some public place to students and others interested, on the architecture of the Renaissance in France, England, Italy, and possibly in Germany and Spain. It was found impracticable to complete the arrangements for this course of lectures in time to commence them during the past season, and they were deferred to the present; and for the series of discussions mentioned above, another series was substituted, which promised not less the improvement of the members.

The instances in which one architect gets from another any thing like a full and frank criticism of any work which he has done are, as everybody knows, extremely rare. And yet this is the only criticism which he is likely to value or regard. Our complaisance generally gets the better of our frankness, and we tell each other any number of white lies, or black ones, rather than risk the hurting of that sensitiveness which we are believed to share with all those who follow art in any of its branches. It was believed by our Committee that this timidity, which all will admit to be the opposite of respectable, was capable of being overcome, and that at least once a month, in open meeting, with the moral support of his fellows about him, a man might be got to say honestly what he thought of his neighbor's work. Our Committee therefore proposed that at each meeting of the Society, some prominent building, designed by one of its members, should be set up for examination and criticism; that the building to be discussed should be announced at the previous meeting, with the names of two members who were to open the discussion; and that a full, free, and frank expression of opinion should be expected on all points of design and construction, be they good or bad.

The proposal was received with mingled feelings of approbation of the idea, and misgivings as to the result. There was, I believe, no one who did not gladly admit that such criticism as that proposed was precisely what is needed by all architects, whose work is done in solitude, without the stimulus of contact with fresh minds, and with an ever-growing tendency to run in narrow ruts of habit. But there was much fear in the minds of some, that the frank criticism would be relished by the recipient only so long as it approved and praised, and that when it began to condemn, we should find mortification and injured vanity and hard feeling spring up and grow apace, to the destruction of all our cher-

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ished good feeling and harmony. The plan was however tried, and persisted in to the end of the season. Four recent buildings were discussed and fully discussed, — the new church of the Old South Society, the Alumni Hall at Cambridge, the Town Hall at Brookline, and the Museum of Fine Arts. In none of these cases did either the introduction or the following discussion take the form of unmixed praise; in some of them the criticism was pretty sweeping and radical, but I think I shall be sustained in saying that in no case was there even so much as a momentary disturbance of good feeling. I will not say that in all cases the utmost was urged that might be urged in disapproval. Doubtless the tendency was to soften the expression of adverse criticism a shade or two. But when this allowance is made, the plan must be said to have worked well, and it will undoubtedly be continued in the meetings of the present season.

The course of informal lectures by members of the Society, referred to in my last report as having been delivered before members and others in the spring of 1875, were repeated during the months of March and April of the present year at Worcester, Mass., by invitation of the Mechanics' Institute of that place, and were attended by large and apparently interested audiences.

Four new members have been elected during the present year; viz., Mr. G. A. Clough, Mr. H. M. Stephenson, Mr. W. J. Paine, and Mr. H. P. Clarke.

The list of members accompanies this report, which is respectfully submitted by,

CHARLES A. CUMMINGS,
Secretary of the Boston Chapter A. I. A.

REPORT OF THE SECRETARY FOR FOREIGN CORRESPONDENCE.

BOSTON, Oct. 7, 1876.

To the American Institute of Architects.

The papers of the late Secretary for Foreign Correspondence of the Institute came into the possession of the present incumbent of that office too late to enable him to carry on his functions with the necessary degree of activity and intelligence. This delay is to be the more regretted, because he has thereby been prevented from properly availing himself of the opportunity afforded by the Centennial of duly offering to our foreign correspondents such formal hospitalities as the great occasion would seem to demand.

The letters lately received by him moreover contain sufficient expressions of congratulation and professional sympathy from our brethren in other lands to give assurance that such official tenders as he might have been able to make have been scarcely needed to render our affiliation with them complete and cordial.

Your Secretary for Foreign Correspondence has caused to be engrossed and forwarded to the Austrian Society of Engineers and Architects a formal acceptance of its generous gift to the Institute of the interesting and instructive collection of drawings and photographs which illustrate in this international exposition the latest works of engineering and architecture in that country. The letter of the Austrian Society was an expression of good feeling which we were prompt to reciprocate.

Among the most interesting papers received by us have been those of our active correspondent, the Chevalier da Silva, of the Society of Portuguese Architects. In them he reports the results of the archæological investigations carried on under his efficient direction, and takes occasion also to ask our sympathy for the efforts to establish a school of art in Portugal, and to direct attention to the exhibition of its works at Philadelphia.

At the opening of the year the usual exchange of official congratulations took place between the representatives of the principal foreign architectural societies and ourselves.

In furtherance of this system of professional reciprocity and to promote the sentiment of mutual regard, it is to be hoped that the members of the Institute who are about to travel abroad will, as in several instances heretofore, through letters of credence or introduction from the Secretary of Foreign Correspondence, put themselves in personal communication with our foreign brethren. By this means and by that active correspondence and interchange of good offices which should be maintained between the Institute and its friends in other lands, we may expect not only to secure for ourselves the obvious advantages to be derived from a better acquaintance, but to present an increasing claim to the interest and sympathy with which the older societies have ever been ready to regard the new conditions under which architecture is developing in this country.

Respectfully submitted.

HENRY VAN BRUNT,
Secretary for Foreign Correspondence.

REPORT OF THE COMMITTEE ON EDUCATION.

(*Condensed.*)

THE most interesting thing in regard to professional education that has come to the knowledge of your Committee during the last year has been the establishment, under the care of Mr. W. L. B. Jenney of Chicago, of a school of architecture at the University of Michigan. The energy and success with which the older branches of instruction have been administered at Ann Arbor are the best warrant for expecting the best results from this undertaking. But its history, like that of the similar undertaking at Syracuse of which we made mention in our last report, and which is still only in its beginnings, belongs to the future.

Meanwhile the Committee have to report that the State Industrial University at Champaign, Ill., has since the year 1871 maintained a course of instruction in architecture, at present under the charge of Mr. N. C. Ricker, one of its own earlier graduates. The course of instruction extends through four years, and embraces beside the modern languages and the scientific study of construction, modelling in clay and plaster, and architectural drawing and designing, and the study of contracts, specifications, and estimates. A work-shop for practice in model-making is attached to the school. The art-gallery of the university has a remarkably good collection of casts and the beginning of an architectural library.

The course of study at Cornell University, under the care of our Honorary Fellow Mr. Babcock, continues much as in previous years; the marked improvement in the quality of the students, and an increase in the teaching force, giving constantly a better and better tone. As before, no students are received but those who follow the full four-years' course, — a rule which contributes directly to maintain a high intellectual standard, though of course the multiplicity of studies interferes with the more strictly professional work. Designing is practised during the last year, and is pursued with great zeal. The best results are of course obtained from students who have been in architects' offices previous to entering the university; and it is found that the time that can be found for drawing is too short to obtain results of much value from students who have had no previous training; those who come from carpenters' shops, for example, doing excellently in their scientific work, but seldom distinguishing themselves as draughtsmen. The advantages this school possesses in regard to books is still unequalled, and a valuable series of illustrations for lectures is gradually accumulating. But it suffers for lack of other apparatus of every kind. There were last year twenty-nine students, two of whom were young women, in attendance upon the course in architecture; and twenty-eight students from the other departments of the university attended the lectures on ancient architecture or on building-materials and construction.

Of the instruction at the Institute of Technology at Boston there is little to add to what we said two years ago. The work has been steadily improving, partly because things are on a firmer footing, partly because the quality of the students improves. More and more of the students come to the school from offices, to get what offices do not offer, bringing with them the workmanlike habits that an office gives. Every year, too, there is a larger proportion of regular as distinguished from special students; that is, of those who pursue the general scientific and literary culture the Institute offers, instead of confining themselves to a purely professional work. Nearly half the students are now taking the four-years' course. This is a matter for twofold satisfaction. It is better for the profession and for the community that the rising generation should be as well-educated a set of men as possible. It is also better for the young men, for if they succeed in establishing themselves as architects they will by and by need all the culture they

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can get. If they do not succeed in this profession, they will need all the resources they can command to gain a footing in some other.

It remains to consider how far this Institute can itself be counted among the agencies of architectural education; what it does and what it might do for the culture of the public, of its own members, and of the young men who are just entering the profession.

Here the record of what has already been successfully accomplished, as it has from time been recited to you in the reports of the several Chapters, is, so far as it goes, the best explanation of what may be done in the future. By establishing courses of lectures, by organizing exhibitions of architectural drawings or of the decorative arts connected with building, and by taking the lead in the foundation of permanent museums either of building-appliances or of the industrial and decorative arts, architects and architectural societies may at the same time instruct the public and educate themselves.

The meetings of the Chapters afford however, of course, the most obvious means of promoting the educational interests both of practising members of the profession, and of the young men who are just entering it. None are so well informed but that they have much to learn; none are so young but that it is time to begin. If we would each of us take some topic of which we know something but would gladly know more (and there are many such, ranging through the whole compass of the architectural gamut), and, first ascertaining the outlines of our own ignorance, take some one of our younger friends into our confidence, indicate to him the narrow bounds of ascertained fact, and make him push off in our behalf into the ocean of the unknown, the experiment could hardly fail to be a successful one. There is none of us who is not painfully conscious of his ignorance on some familiar topics, which he knows he could entirely dispel if he only had a little leisure. One may be longing to clear up or settle his notions on the subject of Greek mouldings, to know how many varieties the Greeks really used, whether they used them on any settled principle or capriciously, whether scale had any effect on the forms adopted, what regard was paid to material, and what changes in custom came with lapse of time. Another may be unhappy about waste-pipes and stench-traps, knowing that his knowledge, though so far sufficient, was vague and without precision, and that he might any day be floored by a too knowing client or too ignorant plumber. An intelligent boy turned into a good library might solve either of these harassing questions, or collect materials for his chief to solve them, in the leisure of a month, and serve himself, his friend, and the company whom at the end of the month they would enlighten with the result of their labors. If diagrams and illustrative sketches were needed, so much the better for all concerned, though it required another month to get them up.

It is by some such immediate real and personal incentives to private study, that the junior members are to be aided; not by universal competitions, which would be difficult to carry on through the post-office; still less by finding places for young men out of employment, a search which from the nature of the case everybody must conduct for himself. Nobody takes in even a cook, without first arranging a personal interview.

This Committee at any rate are concerned not so much with finding young men in work, an office which the Secretary has done much in filling, as in showing them how best to improve their leisure. Leisure may come unasked, but to a student it is never in itself unwelcome; and a young man's first care should be to so husband his resources that when it does come he may enjoy the boon without misgivings. Men spend their lives longing for such opportunity, and it is the shortest of shortsightedness in a professional student not so to arrange his affairs as to be glad when it comes of its own accord, and it is the best result of any schooling, if it can so teach young men to study that they can employ enforced leisure to advantage. In point of fact there is no time of his life at which a few idle months are to the architect more useful. To be able, after having acquired the use of one's hands and eyes, and obtained a superficial knowledge of construction and of design, to spend whole days in rendering that knowledge more exact, visiting buildings, watching workmen, and questioning contractors; following it up with long evenings of technical or scientific reading in text-books, encyclopedias, and the professional journals; clinching the knowledge thus gained with the study of specifications or working-drawings, and illustrating the whole with sketches from the object or better still from memory,—all this, important and even necessary as it is to a proper professional training, is nevertheless almost out of reach both of the draughtsman and of the architect, since it requires the uninterrupted leisure and continuous attention that can only be commanded when one is absolutely out of work.

VALEDICTORY ADDRESS.

DELIVERED BY DR. E. L. MAGOON.

THE American Institute of Architects will please accept the present address, however imperfect in itself, as the best proof its author can give of the appreciated honor in being invited to make the attempt.

Architecture is the oldest art, and bears the most comprehensive type. It teems with the oracular inscriptions of entombed empires, and either affords information where other testimonies are silent, or confirms the facts which more dubious history asserts. Within its ruined temples yet linger the echoes of cycles long since departed, and which symbolized on their track the mightiest impulses of emulative nations in those monuments which inventive genius, coalescing with constructive skill, stamped with the attractions of beauty and strength.

The creative spirit and plastic power of architecture was first conceived and has ever been best exemplified by the Greeks. Among them art and its execution were one and the same thing; mind ruled matter in exact equipoise; form and structure stood harmoniously allied. Out of cumbrous Egypt they elaborated Doric majesty, reduced Asiatic redundance to Ionic grace, and consummated monumental art in Corinthian magnificence. In these three orders, the latent unit of all preceding aspiration and subsequent development, with perfect elegance of contour and infinite purity of lines, every type of excellence was realized. For example, the echinus of the Greek capital for refinement of conception and grace of execution is the masterpiece of plastic genius.

Architecture expresses the difference among races as language does the variety of dialects. The Dorians built in the same style that was employed by Pindar, Æschylus, and Thucydides in speech. The simplicity and elegance of the Ionians are exemplified in their temple graces not less than in Homer's matchless verse, and the smooth rhythm of Herodotus; as no less clearly the Corinthians stamped upon their invention the delicate luxuriance which characterizes the language of Isocrates. The opposing principles of Dorism and Ionism which prevailed in all institutions of Greece — politics, literature, customs, and art — were boldly embodied in sculpture and architecture. The former came from Egypt, and the latter from Asia; but both were alike indebted to Western genius for the refined symmetry which their respective orders finally assumed. The zenith of perfection was not reached until the Doric influence was impregnated by the Ionic, the material by the spiritual, and Corinthian delicacy was born to perish in the grave of its exhausted parents. When the West fell into the hands of barbarians, Roman monuments which covered the soil of Italy, Spain, and Gaul were destroyed or mutilated, and many centuries of profound darkness enveloped mankind.

In the meanwhile structural art was transformed. The arch which Rome found in Etruria and carried to the Bosphorus was so modified by Greek taste as to become the creative element and crowning glory of a new architecture. Christianity, emerging from catacombs under the throne of Cæsars who never supervised the construction of their own palaces, in the sixth century rose supreme on the pendentives of Santa Sophia, when Justinian exclaimed, "Glory be to God, I have conquered thee, O Solomon!"

That every vestige of good in the little East might be conserved and brought forward in the continuity of architectural culture for the great West, it is curious to observe how Greeks in blood and familiar with all antique worth, as were the disciples of Nestorius exiled from Constantinople in the year 431, garnered primitive treasures on the banks of the Nile, and were employed

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as religious builders by Mohammedans in Arabia, Africa, and Spain.

Another current of Byzantine art flowed from the original source under exarchate auspices at Ravenna, modified by Roman traditions, until it reached the upper Rhine, where, moulded by the antique Greek spirit, the first elements of mediæval art crystallized. Occidentals in the East and Orientals in the West, from Pericles on the Acropolis to the ninth Louis of France, all pure architectural types are Greek produced and promulgated by those great cultivators of ancient and modern Europe, the cosmopolitan guardians of civilization, humanity, and the arts. Despite servitude to foreign power, almost always its enforced state, Greek genius, inspired by an ideal of intellectual perfection, maintained its brilliant vitality through disastrous war and densest gloom down to the fifteenth century, on the remotest edge of the eastern hemisphere, and thence arose after dire eclipse, to shine with augmented splendor round the world.

The Pagan mind should no more be despised than the Christian. The first turn in the wheel of human development was not less valuable than the second, which it necessarily preceded. We are now on the vantage-ground of vastly more ultimate historical knowledge and spiritual insight into architectural progress than our predecessors; and in the same proportion it behooves us to have an appreciative sympathy for the varied beauties we inherit.

The foremost scientific doctrine of our day is the divine lesson that all forces, as well as all forms in the universe, are immortal sisters and brothers. But Theseus, King of Athens, intuitively saw this truth twenty-five centuries ago, and instituted the Panathenaic games at Athens, in order to procure from the people of Africa the recognition of that city as their metropolis. Generations so moulded and inspired could not fail to cherish a kinder regard for national splendors extant or extinct; and at every step in their history we meet a reminiscence consecrated by a monument.

It is a fine thing to have a cosmopolitan spirit, and to hold all ideas as common property; but the foremost facts most clearly prove that the Greek brain is not constructed like the Roman, the German, or the English. Preceding realizations in art have not exhausted artistic possibilities. An architect may be as original now as at any former time, but it will result only from the development of his own personal power, and not from merging his individuality into something alien to himself. Because architectonic principles are invariable, it by no means follows that their amplitude is exhausted, or that modes of design should remain unchanged, stifled by traditional rules. He who is really erudite in the study and adroit in the application of architectural science may exemplify invention the most delightfully unique, as poets of the widest reading are usually the most worthy of being read. Effective intellects ever illustrate the future from the past, as brave crusaders sharpened their swords on ancestral tombs.

When Germanic tribes, mingling with barbarous torrents from the North, precipitated themselves upon the effete South, a new amalgam was formed, out of which all the moulds of modern culture have been filled. Teutons, Lombards, Franks, Burgundians, and Goths, seemingly extirpators most fatal, were in fact overflowing with the principles of a new life, which evoked a most wholesome art-movement in the stagnant pool of Rome.

Children nursed by a she-wolf were potent in fight only, and contributed to civilization but one element, — jurisprudence, the science of combat. Romans clothed every thing in a legal shape, but never embodied a beautiful idea. They were marvellous builders, without using a single type of their own invention. They were as poor in literature as in art, and for the same reason, being in both equally void of sincerity. They no more believed in the Æneid as Greeks believed the Iliad, than Augustan architects believed in the orders they first degraded and then consecrated to Venus or Apollo. All great art that ever was has been inspired and employed by the patroness of purest faith, Minerva or Mary.

In the eleventh century the monasteries of Gaul were the chief asylums of genius, and took special lead in architecture, which they made in their own image, a true and living art. But another spirit soon gained supremacy in the hands of laymen, who abandoned Romanesque construction and Byzantine ornament, preferring flowers of the field and leaves of the forest as decorative motives. Then followed the three types of pointed architecture, when quarried strength invested with chromatic charms canopied encyclopædic instruction around shrines where Jehovah was sublimely adored.

We delight in contemplating a beautiful temple, as we do a majestic tree, because all its parts from rooted trunk to soaring boughs clearly indicate vital conditions and firm endurance. Art, as the mediatress between nature and man, is the power of infusing human thought and passion into every thing which is the object of contemplation. Form, color, expression, are elements which it combines in the mould of a moral idea, and thereby the spirit of every age becomes most legible in its architecture.

Christopher Wren was knighted for paganizing England. The old St. Paul's, which he caused to be removed after the great fire, was the finest cathedral ever built, and might have been restored for much less than it cost to erect the colossal mediocrity he has left instead. It encumbers earth as the biggest illustration of that frigid reform which saved something of the science of religion, perhaps, and killed most of its sentiment. Additional products and proofs of the same spirit obtrude in all the Wren churches of London, in the Wolsey tower at Oxford, more strikingly still in the central spire at Lichfield, and most excruciating of all, in the infamous towers with which he burdened the front of Westminster Abbey.

So far as an architect feels repugnance to Catholic dogma, he is incapable of reproducing mediæval art, even when the purest specimens are directly before him. Witness Ely Cathedral, one of the best attempts at restoration, and Chester, the last. At Melrose, or Netley, or Tintern, you can wander with sorrowful delight, where only rooks and ivy and wildly waving foliage attend your scrutiny of exquisite lines and sacred symbols shattered above, beneath, and all around. But even that ruined condition does not hinder your direct sympathy with those who came thither when our ancestors were barbarians, and evolved the culture which has beautified the world. On the contrary, in the ancient shrine, "restored" but not returned, as you walk from west to east, scanning the newly burnished beauties, so largely derived from Birmingham, embodied instruction grows equivocal at each remove, and historical association is most confounded just where vivid interpretation should most appear; so that on architectural grounds alone, the scripture pathetically recurs, "They have taken away my Lord, and I know not where they have laid him."

If Protestants desire an edifice for religious use, let them provide such in harmony with their own belief, but without the distorted subordination of hallowed forms created and characterized by an ignored faith. When you remove the rite of initiation from frontal entrance to inner chancel, and over the yawning baptistery hang a florid organ where for fifteen centuries only the lighted altar stood, it is not a point of doctrine that we attack or defend, but only the stupid contempt of architectural propriety we deplore.

At the political capital of the Empire State, is a "meeting-house" built apparently after the "Dutch Corinthian" style, and surmounted by a peaked structure which from the ribbed ball and huge fish at the top is known as the "pumpkin and codfish steeple." Nor does the incongruity greatly offend the eye, since there is no attempt at fine art in the general design, and the piscatorial revolver, however cumbrous, yet serves practically as a weather-vane.

But look out upon the goodly city, or any other of our land, and you will see at a glance a score of pretentious churches, with towers guiltless of bell or clock, having spires that taper away into nothing but glaring ball and pointed iron bar, — a pumpkin and poker, — absolutely nothing more! Why allow yourself to be a party to such absurd perpetrations? As obelisk and cupola are irrelevant to Greek entablatures, a true spire is an architectural impertinence upon any structure either Byzantine or Romanesque. Upon a Christian edifice, no summit is complete without its congruous finial; and the crowning apex never properly ends but with the divine emblem alone, by which, from nave,

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transept, and sanctuary foundation, up through a thousand converging lines, all was inspired and unified, — the cross.

It costs no more to build consistently than absurdly. Architects who understand their business know that ten hundred or ten thousand dollars can be put into chapel or church of rustic materials, free of all constructed ornament, and yet marked by as true lines of distinctive beauty as any metropolitan fabric that has cost millions to execute.

Are you applied to for a specific design? Ask where and for what use is the prospective edifice, and at what cost. You know the material, see the ideal, and indicate in sharp outline the perfected creation to be realized. That done on your part, the elaborated plan which was carefully studied, each separate member in its relation to every other as an organic whole, may, to please capricious whim, be outrageously mutilated, or shrink under parsimonious demand. Well, let the pious parties so murderous in their conduct be speedily hung without benefit of clergy. It is a sad necessity, doubtless; but better that a few nuisances be put under ground at once than that a disfigured masterpiece of art be obtruded upon the agonized public in perpetual gaze.

In all true architecture it is impossible to separate the soul from the body, as in the vegetable and animal kingdoms every integral part is the result of structural necessity. In nature this organic law admits of exemplification infinitely diversified; and no less in art, as mediæval works most abundantly attest. Then the exponents of a vital growth did not struggle to adapt fresh conceptions to effete forms, but perpetually modified antiquated shapes, thereby playing forth with yet gladder freedom the full advantages of new ideas.

A competent architect will create beauty out of the means that are furnished him in the nineteenth century, as in the thirteenth a prodigious quantity of churches, palaces, and chateaux, all differenced in plan, were achieved, yet each one as original in form as it was related to distinctive time and use.

Wealth is most wisely used in giving grandeur to public works, adding ornament to utility, and shedding splendor on the profitable, thus rendering every structure connected with popular progress a monument of national magnificence. The divinest authority taught that artistic excellence is not extravagance, but beneficent thrift.

Architecture commemorates departed nationalities when their dominion is no more. It is our high privilege to rake the ashes and garner the wealth of universal remains, striving to emulate when we can neither rival nor restore. To strip earth of foliage and reduce it to a naked ball, shear the sun of his beams, and blot effulgence from the stars, would be no more devastating to physical welfare, than it would inflict mental misery to ignore the ennobling influence of architecture on mankind.

The bases of the arts touch each other, and no devotee can be expert in either who does not earnestly relish all. Magnanimous admiration appropriates the excellence it confronts, while ungenerous depreciation is its own punishment, because envy is impotency. Since God will not have his work made manifest by one who is ashamed of truth anywhere, the cowardly are never creative. Only as divine integrity kindles the fearless but friendly heart, will fluent fingers elaborate work divine.

Every nation can do something which others cannot, showing that the net amount of mankind does not greatly vary. As each person is superior to all others in some individual faculty, that one is altogether the noblest who most assimilates himself to the best in each competitor, and so aggregates every variety of worth.

We are most divinized by closest contact with truest symbols of divinity, those temple glories which have been the culture of humanity in all ages. In their presence the mind spontaneously opens responsive to laws which traverse the universe, suggest infinite relations, and inspire the wish to admire evermore.

In rendering worship to exalted worth we elevate ourselves; and just so far as we evince sensibility to superior merit, we are by it imbued. Great masters raise us from our dead level by their generous aspirations; they lift us into the magnificent scope of their own free souls, and endow us with a more heavenly existence. Lapsing centuries only add preciousness to such men and their works; time, which defaces or obscures the fairest things, but dissolves temporary mists which overshadow them, and they re-appear with enhanced splendor to the clarified vision of remotest generations. Great architects are ever living wealth. They constitute the foremost life of the eras to which they pertain, and send vitality down to ages which long after supervene. There is a power in architectonic genius to quicken disintegrated clods. The dead, in the limbo of extinct marvels, hear it responding to its call in the resurrection of a newer and more divine existence.

At ten o'clock in the evening of Oct. 11, 1492, near this very hour, lurid light was first seen by Columbus on the eastern shore of a new hemisphere. Out through the dusky view before the great discoverer that night, lay a whole world of all possible productiveness. And so, from the terminus of our first century in national progress, we contemplate the magnificent domain of predestined development. You cannot fail to perceive in sublime perspective the noblest arena ever offered to artistic competition, nor will you cease to ennoble your own manhood as the best guaranty of professional success.

The Divine Architect has designed earth as an institute, in which himself is superintending the education of our race. Therein we should learn that the True, the Beautiful, and the Good are exactly co-ordinate, and neither of them can fully effect its end without the co-operative ministry of its associates in every sphere. It follows that æsthetic virtue is its own reward. As the love of nature grows with the study of nature, so delight in art deepens and strengthens with magnanimous progress in devout pursuit.

The laws of earth and heaven are connate, centralized in the human soul, that microcosmic temple wherein all creativeness unfolds. Parthenon and Pantheon, Santa Croce and Cologne, are only specimen copies after a divine model as yet but inadequately expressed.

According to classic legend, Helen, when she explored nature for a model of a golden cup that she should offer upon the altar of Diana as perfectly beautiful, found nothing more exquisite than her own bosom. Nor is there any thing in creation we can present to the Creator more worthy or acceptable than our own immortal being, when fairly dealt with and elicited. May each of you exemplify masterly skill in all charming design, and execute in your own person a consummate temple of the Holy Spirit!

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

(SUPPLEMENT.)

TENTH ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS, HELD AT PHILADELPHIA, PENN., OCT. 11 AND 12, 1876.

ANNUAL ADDRESS BY A. J. BLOOR, F. A. I. A.

Mr. Chairman, and Gentlemen of the Institute.

OWING to continued indisposition, our honored President, Mr. Upjohn, has again deputed to an alternate the Annual Address which is due at each regular Convention of our body.

In this Centennial year it seems almost incumbent on us to cast a retrospective glance over the field of architecture in our country during the last century. But as might be expected in a new community which has had, amidst the war-whoops of savages and the incessant influx of crude material from the overstocked populations of the Old World, to hew its way to comfort out of the primeval forest, the record of its achievements in that one of the fine arts which is most costly of execution is as meagre as it is recent. Moreover, so far as concerns Government buildings, which have included the most important secular structures of the country, the subject was reviewed by Mr. P. B. Wight at our last Convention, and his paper has since been published in the *American Architect and Building News*.[1] Still more recently, and with more general scope, it has been brought to your attention in the pages of the same periodical, in conjunction with a review of the present condition of the building art among us, and some speculations as to its future. I am therefore largely relieved in the performance of the duty with the execution of which I have been honored.

Going back beyond the century, our President, Mr. Upjohn senior, has in a paper read by him before the Third Annual Convention of the Institute given us some account of the colonial architecture of one section of the country, viz., of New York and the New England States. Mr. Upjohn and the author of the articles in the *American Architect* concur in assigning a measurable degree of refinement to such of the colonial work as remains to us, though the latter is careful to confine his commendations more specifically to its detail. But while we grant this, we must at the same time bear in mind, that for obvious reasons it is the best examples of man's handiwork that, as a rule, remain to posterity.

Judging from the scant records of existing structures contained in the literature and graphic art of the British colonial period of this country, — then comprised in the seaboard strip lying between the St. Lawrence and the Altamaha, — it seems clear that Thomas Jefferson's remarks on the subject with reference to Virginia may be applied to the buildings of all the provinces, with exceptions in the largest towns, which may be counted on the fingers of one hand. The best of the colonial churches, government buildings, and places of assembly, were but meagre copies, in whole or in part, of some of Wren's designs. Still existing examples may be found in Christ Church and Independence Hall in Philadelphia; King's Chapel, the Old South Church, and Faneuil Hall, in Boston; and the body of St. Paul's Church (the spire is post-colonial) in New York. The body of the two-hundred-year-old church in New York, lately used as the post-office, and which now awaits demolition for commercial purposes, is simply an amplification of a barn. The upper story of the low square tower which alone raised it beyond that rank, and from which Franklin made his first experiments on lightning in reference to electricity, was removed a year or two ago.

Writing toward the end of the Revolutionary war, Jefferson says,[1] "The private buildings are very rarely constructed of stone or brick; much the greatest proportion being of scantling and boards, plastered with lime. It is impossible to devise things more ugly, uncomfortable, and happily more perishable. There are two or three plans, on one of which, according to its size, most of the houses in the State are built." He then goes on to observe that in the whole State of Virginia "the only public buildings worthy of mention are four, all of them in Williamsburg," which had been the seat of the State Government; and in detail he shows that the principal of these, the Capitol, is full of faults, that the second, styled "the Palace," is not handsome without, but spacious and commodious within, and that the remaining two, a college and a hospital, "are rude misshapen piles, which but that they have roofs would be taken for brick-kilns." He adds, "There are no other public buildings but churches and court-houses, in which no attempts are made at elegance. Indeed, it would not be easy to execute such an attempt, as a workman could scarcely be found here capable of drawing an order. The genius of architecture," Jefferson proceeds, in an oft-quoted sentence, "seems to have shed its maledictions over this land. To give them symmetry and taste would not increase their cost. It would only change the arrangement of the materials, the form and combinations of the members. This would often cost less than the burden of barbarous ornaments with which their buildings are sometimes charged." From which last remark it appears evident that the father of American Democracy by no means shared the exaggerated notions of Prof. Huxley on the expensiveness of façades.[2] "But the first principles of the art," Jefferson goes on to say, "are unknown, and there exists scarcely a model among us sufficiently chaste to give an idea of them. Architecture being one of the fine arts, and, as such, within the department of a professor of the college, according to the new arrangements, perhaps a spark may fall on some young subjects of natural taste, kindle up their genius, and produce a reformation in this elegant and useful art," — from which you perceive that the question of professorships of architecture in American colleges is not a new one, and indeed Jefferson, who greatly affected the fine arts, and particularly architecture, to which he had paid attention while abroad, had mainly brought about these new arrangements of which he speaks. "But all we shall do in this way," he continues, "will produce no permanent improvement to our country, while the unhappy prejudice prevails that houses of brick or stone are less wholesome than those of wood." Then follow two or three pages of argument to prove this notion fallacious, and he winds up the sub-

[1] Nos. 10, 11, and 12.

[1] Notes on Virginia.

[2] Address of Prof. Huxley to the Trustees of Johns Hopkins University at Baltimore.

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ject thus: "A country whose buildings are of wood can never increase its improvements to any considerable degree. Their duration is highly estimated at fifty years. Every half-century, then, our country becomes a *tabula rasa* whereon we have to set out anew, as in the first moment of seating it; whereas, when buildings are of durable materials, every new edifice is an actual and permanent acquisition to the State, adding to its value as well as its ornament."

Jefferson's naïve observation as to the difficulty of finding a workman capable of drawing an order at once shows how completely our infant country was then dependent on the manual artisan for such trivial attempts at design in architectural form as its highest classes, familiar with the models of Europe, desired to produce; and suggests his own share, notwithstanding his great and highly cultured intelligence, in the narrow delusion, not yet quite extinct among old-fashioned amateurs, that all of architecture worthy of classification is comprised in three specific forms of columns with their appendages, used in one of the many epochs of the art, and of the variations of these employed in a succeeding epoch.

This combination of ignorance, alike in patron and workman, with the non-intervention of a trained specialist in architectural design, forms the groundwork for an amusing sketch by J. Fenimore Cooper in one of his novels;[1] the time a little later, — 1793, — and the scene farther to the north, one of the new counties just reclaimed from the wilderness near the centre of the State of New York. Speaking of the great house of the newly laid out village, he says, —

"Richard had completed his design. He had availed himself, in this heavy undertaking, of the experience of a certain wandering Eastern mechanic who, by exhibiting a few solid plates of English architecture, and talking learnedly of friezes, entablatures, and particularly of the composite order, had a very undue influence over Richard's taste in every thing that pertained to that branch of the fine arts. Not but that Mr. Jones affected to consider Mr. Hiram Doolittle a perfect empiric in his profession, being in the constant habit of listening to his treatises on architecture with a kind of indulgent smile; yet, either from an inability to oppose them by any thing plausible from his own stores of learning, or from a secret admiration of their truth, Richard generally submitted to the arguments of his coadjutor. Together they had not only erected a dwelling for Marmaduke, but had given a fashion to the architecture of the county. The composite order, Mr. Doolittle would contend, was an order composed of many others, and was intended to be the most useful, for it admitted into its construction such alterations as convenience or circumstance might require. To this proposition Richard very gravely assented; and it was by this union in sentiment that the composite order, or a style of architecture that emanated from the carpenter's own genius, with a few suggestions from the other, became the fashion of the new county."

Some of us perhaps have discovered how easy it is, in our own time, after enduring a little preliminary abuse, to set the fashion — sometimes followed by the local mechanics and their patrons with the most ludicrous shortcomings or still more ludicrous "improvements" — for country houses in very rural districts erewhile not given to art. This particular forerunner of "cottages ornées" and "magnificent villas, replete," etc., is further described as of "stone, large, square, formal;" having a diminutive porch duly styled a "portico," and described by the author as being "of four little columns of wood" supporting a shingle roof; the whole, being firmly fastened to the side of the house, had become divorced from its sinking platform, so that a "second edition of the base was given, with additions and improvements." It also had — to condense the author's circumlocution into technical terms — a four-hipped shingle roof, with a deck, the platform thus formed, as well as the main cornice, being balustraded and ornamented with "divers urns and mouldings." Our professional grandsire and his patron had not only essayed to keep down and hide the chimneys, by assimilating them to the ornaments of the main balustrade, above which — the primeval log needing outlet for its smoke as much as the cannel coal of our own days — they had subsequently been lengthened in naked deformity; but they had endeavored to hide the roof in advance of modern polychromy, and not having the fear of Owen Jones before their eyes had painted the shingles successively a sky-blue, a "cloud-color," and an "invisible green," in the at first sanguine but gradually decaying hope that the eye would lose the vast expanses of shingle against the heavens, the clouds, and the pine trees, supposed, one after the other, to constitute the most prominent background; and ending with a last resort to "sunshiny yellow, so called both from its resemblance to, and its power to resist, the rays of the great luminary." The attempt to hide the roof is evidently considered a praiseworthy one by our author, who informs us that it is "a part of the building that all writers agreed was an object that ought to be concealed;" and it is therefore perhaps fortunate for his peace of mind that he was removed from this stage before the days of the "French roof," and the still later stretches of Japanese-like covering surmounting Queen Anne elevations and gablets. But his sketch of the art doings of the firm of Jones and Doolittle, the latter of whom, by the way, always worked by "square rule," is lifelike. We have all met their successors.

[1] The Pioneers, chap. iii. and v.

The colonial architecture, so far as the term is applicable to so jejune a phase of the building art, continued in vogue with but slight modifications, and it is safe to say, no improvement, all over the country, till at least the first decade of this century had elapsed; that is to say, so far as the general developments of the country in the building art were concerned, churches, town halls, and other places of assembly — where they were not mere boxes or barns — were still minimized copies of Wren's designs, or of Gibbs and Hawksmoor's *quasi* designs.

But the examples left of the best class of private dwellings are, on the whole, more satisfactory, because less pretentious, than the public buildings. The city houses of the wealthy, when not of wood, seem to have been invariably of brick, two and sometimes three stories high, with stone dressings to the openings, which dressings — as may still be seen in the old Walton House on Pearl Street, New York — were occasionally carved with a good deal of spirit. The country houses of the wealthy, and many of the town houses even, were still, in most instances, virtually the farm-house framed in wood, frequently of oak, and clap-boarded or shingled. One or two additional stories were added, and the width increased so as to enclose two rooms deep, instead of one. When desired, an æsthetical expression was gained exteriorly by the addition of modillioned cornices, moulded generally from correct models, and of porches moduled and columned and entablatured in strict conformity with the rules inherited from Palladio, Scamozzi, Vignola, and other leaders of the *cinque-cento*. But any attempt at unity of design was almost wholly wanting. Country houses of the first class were however not always of wood; brick or stone, as we have just seen, being occasionally employed. The constructive features of the examples that remain of these buildings are all perfectly simple, but, such as they are, are carried out, as a rule, with the best materials and the most substantial and faithful workmanship.

The modillioned cornices of the exterior were repeated in the same material — wood — inside the house, in the best rooms, with the addition of mantel-pieces, often carved — more or less in the styles of Louis XIV. or Louis XV. — with considerable skill, and a delicacy, whether from motives of taste or of economy, going to the opposite extreme of the ordinary meretricious expression of those types, and approaching to tenuity. Wainscoting was frequently added, sometimes treated as a dado, and sometimes carried up from floor to ceiling, but almost always proportioned, moulded and panelled, and sometimes carved, with satisfactory effect. The ceilings of the best class of mansions were occasionally treated with plaster decorations in very low relief, their lines sometimes a little stiff and meagre, but almost always greatly superior to the meretricious and tumid plaster ornaments — so called — used in our time, till very lately, in the most costly buildings of all kinds. Such delicately lined ceilings are to be seen at Mount Vernon; and indeed that whole structure (unless altered since the late war) is a good example of the highest style of the private residence of the latter part of the eighteenth century and the beginning of this, and is interesting moreover as affording indications of the æsthetical development of the Father of his Country, the circular colonnades leading sidewards from the main central building having been designed, it is said, by Washington himself. Another good example of the first-class dwelling-house that linked the colonial period to that of independence, and which has a round-headed entrance

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doorway that ought to please our young Queen Anne students, may be found in a veritable "Washington's headquarters" just outside the village of Morristown in New Jersey. The Hancock House overlooking Boston Common was unhappily demolished some thirteen years ago, but its prim elegance and satisfactory effect must be within the recollection of most of you. The houses mentioned are or were all built of wood above the basement story.

As regards public buildings, the beginning of the century introduced a change. The thirteen provinces that had thrown off the yoke of the mother country were now a confederation, with a clear outlook toward a front rank in the family of nations; and the arena requisite for the administration of the Federal Government called for statelier treatment than that which had sufficed in each of the separate colonies for the simple governmental needs of a sparse population of pioneers. The Capitol of the United States began to show the germ of the magnificent appearance it now presents. Successive architects, imported at first from Europe, and of whom Latrobe should be specially mentioned, carried it on through various stages and under many tribulations, till Thomas U. Walter, the Chairman of this Convention, and the architect of others of the national buildings and of Girard College, added the north and south wings, and crowned the centre with the majestic dome which now, visible at every point for so many miles around Washington, rises as a landmark for the nation.

The progress of the Federal Capitol seems to have fired the ambition of Philadelphia and New York, for during its early stages the Pennsylvania Bank was built from designs of the elder Latrobe; and Mangin, a French architect, was called on between the years 1803 and 1812 to plan and supervise the City Hall of New York, an exceedingly meritorious example of French Renaissance; and applied to its south front his skilful and elegant adaptation of the lake façade of the palace of Fontainebleau. In the latter city also an equally good translation of one of Wren's best spires was placed on St. Paul's Church, the upward lines being carefully battered and thus preserving the elegant outlines of the original. We all owe a good deal to Fergusson; but considering that the original Washington Capitol, the New York City Hall, and other buildings I have mentioned, were in existence before the completion of the first decade of this century, it must be confessed that he is a little out in his chronology when he says, "From the time of the earliest colonization of this country till after the termination of the war of 1812–14, there was not one single building erected in Northern America which is worthy of being mentioned as an example of architectural art."

Simultaneously with the "local habitation" for the Legislature and Judiciary of the Union, a residence was projected for its chief magistrate. Some of us at our last Convention in Baltimore had an opportunity of inspecting in their original depravity the extraordinary crudities in the guise of plans and geometrical elevations (none of them that I remember flowered into perspective) furnished by the patriotic zeal of the country for the Federal Residence, as most of the drawings style it. Not one of them showed the slightest training either in design or rendering, or would be tolerated in a modern architect's office as the handiwork of a boy pupil during the first month of his novitiate. It is perhaps not surprising, therefore, that the Executive Mansion, or White House as it is generally called, is little else than a duplicate of the country-seat of a nobleman in Ireland. In its interior arrangements it is not particularly well adapted to domestic uses, though in its earliest days Mrs. Adams, as she informs us, found the great east room handy as a drying-room for the family wash. It is still less suitable for public receptions. Outside, the effects of its various façades and of the colonnade portico in front are not undignified; and it is not unlikely that this colonnade, together with the importation from Europe shortly afterwards of the classic revival, may have sown the seeds for that wonderful crop of Greek temples — the great majority of them in wood — which in the second decade of this century began to burden the land, and which did not yield to another fashion till it included every thing in its embrace from capitol, church, and college, to cottage and outhouse. Some of the more important of these buildings — as for instance the Sub-Treasury, formerly the Custom House, in New York — are in marble like their immortal prototypes, and are not unworthy renderings of them, so far as façade is concerned, though as regards interior, the incongruity of the type for the usages of modern civilization is, I believe, generally conceded. Many of us have saddening recollections, — indeed, we know them to this day, for Hawthorne's advice that every generation of Americans should destroy its predecessors' habitations has not touched the financial instincts of the multitude with that sense of fitness with which the suggestion was hailed by the æsthetical few, — many of us know the little ambitious country dwelling inspired by the classic temple; the cella being simply an unmitigated frame house, while the front aspires to the dignity of a *distyle in antis*, or still more frequently of a *tetrastyle;* the hollow wooden columns of enormous relative diameter running up to the full height of the two stories of the building, completely blocking up the windows at their back, and filling up the *quasi* piazza so that a chair can scarcely be placed between or behind them.

The Greek temple furor raged with much virulence for apparently a full generation, varied occasionally, it is true, by a resort to the Roman types. And during its latter days its honors began to be divided with the products of Batty Langleyism or carpenter's Gothic imported, as usual, from England. The early examples of this popular experiment in pointed architecture, as still existing throughout this country, are among the worst products of the building art; and the fashion, like subsequent ones, long afforded a teeming field for the aspirations of *soi-disant* architects, both of the amateur and so-called "practical" types, as well as a lucrative one for the enterprise and capital of certain publishers. But it is to be said in favor of Batty Langleyism, that it familiarized the cultivated public with the term "Gothic," and thus opened the door of opportunity for the production of such ecclesiastical work as Trinity Church by the elder Upjohn, and still later the Roman Catholic Cathedral (not yet finished) by Renwick, in New York.

By this time indeed — that is, during the fourth decade of the century — the country had reached such a point in wealth and refinement that along with the demand, hitherto a very confined one, but now general among the more cultivated classes, for opera, painting, and sculpture, had arisen one, however crude and undisciplined, for the expression of fine art not only in their public buildings, but in their private ones. Up to this period most of the wholesale reproductions of European models, or adaptations of their details, for there had been almost no original composition of masses, had virtually been in the hands of self-taught draughtsmen recruited from the ranks of journeymen carpenters and masons, and employed by the master-mechanics. Regularly trained architects had appeared on the scene only when a public building was of such importance that even the most economical and self-complacent of building-committees and the most ambitious and self-seeking of contractors felt the æsthetical element involved in its treatment was too much for their handling, though reduced ever so closely to its minimum as a working factor. Now, however, they were largely employed in designing and supervising the execution of commercial and domestic structures, as well as those for public uses. The change commenced as usual with the more northerly of the cities on the Atlantic seaboard, but quickly spread southward and westward.

It was my first intention to draw on the whole country for architectural examples of commercial and domestic as well as of public work, if my treatment of the subject should demand a resort to specific cases. But it was almost at once apparent that the field is too large to be covered in a single paper otherwise than in a very cursory way, which is the less to be regretted, inasmuch as abler essayists will doubtless illustrate their own sections in detail as opportunity offers. Indeed, before this Convention closes we shall have the pleasure of hearing Mr. Cluss of Washington open the lists for the local treatment of this subject with a paper on the architecture and architects of the national capital.

My references therefore will be not exclusively, but more particularly, directed to New York; not only because I am more familiar with that centre than with

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others, but because though each of our great cities is more and more developing a distinctive type of mercantile and domestic buildings, New York may perhaps better than any of the others be accepted for general reference. Where the largest financial interests centre, eclecticism in art is most likely to prevail.

I recall then that it was in the fifth decade of the century that that fine rendering of mediæval sentiment, Trinity Church, was erected by our president; and that from designs furnished and claimed as his own by Ottoviano Gori, a marble-cutter, A. T. Stewart erected his best architectural work, the lower store, a quiet and respectable example of Italian Renaissance, but chiefly remarkable among the laity, when built, for being the largest structure on the continent devoted to shopkeeping, though it was afterwards much enlarged, and as it stands now does not include a third of the area of Stewart's up-town store built subsequently. At the end of this fifth decade too, or at the beginning of the next, Bowen and McNamee built a store on Broadway, between Pine and Cedar Streets, which was designed by one of the founders of this Institute, J. C. Wells. A roof was added subsequently, but the original façade below the cornice-line remains, though lower New York and Broadway up to the Central Park have since, simply through the growth and changes of commercial interests, been almost as thoroughly rebuilt as Chicago and Boston have been in their burnt districts. Being a clever adaptation of Elizabethan forms and built in white marble, its façade presented a sufficiently striking contrast to the preceding type of commercial building, a few examples of which still remain in down-town streets. These were almost invariably in three stories of brick, resting on granite posts and girder (first introduced by A. J. Davis, for Arthur Tappan, the anti-slavery merchant, in his store on Pearl Street), and pierced with square windows, the lintels of which were perfectly plain or moulded with a single ovolo or ogee, and the whole façade topped out with a wooden or metal cornice.

Each of the structures just mentioned — Trinity Church, Stewart's down-town store, and Bowen and McNamee's store — marks, in its kind, an epoch in the history of the building art in this community. In all directions churches sprang up embracing more or less skilful adaptations of the successive mediæval types found in Europe, still somewhat starveling and timid in design and thin in execution, but far in advance of those in the Batty Langley mode. The study of Alberti's and Palladio's rules for working out entasis and volute was fairly matched, among American and English students, by much poring over the elder Pugin's dicta for finding the mouldings appropriate to Early English, Decorated, or Perpendicular Gothic. Meantime the architects among us under French influence swore by Notre Dame and Amiens, and the later spire of Chartres, and Rouen, and the flamboyant generally; while the Germanized students resorted for grandeur to Cologne and to Strasbourg to prove the superiority of geometrical motives. But probably none of them all rode so high a horse, or was so happy in the saddle, as the exclusive student of the earlier Ruskin, that great inspirer of both layman and specialist, but blind guide for the technical artist. Our Ruskinite generally turned his back on all of these, and luxuriated in serene retirement on numerous elegant and statuesque but top-heavy "bits" from Northern Italy.

The two stores mentioned, Stewart's and Bowen's, apparently gave the impetus, the first to the quieter, and the latter to the freer examples of the new and in many cases overmuch decorated mercantile façades of New York; but so far as artistic merit is concerned, both of them still hold their own against the majority of their successors.

About the same time, All Souls' Church was built under J. Wrey Mould. The most striking part of the design, an immense campanile, has never been executed. The portion built, evidently inspired by San Zenone and other churches of Verona, both as regards forms and party-colored surface, attracted much attention by its novelties to American eyes, especially among amateur critics, and is generally admired by qualified critics as well. Its most apparent influence on the prominent buildings succeeding it, however, appears to have been chiefly confined to strong contrasts of surface tints, not always successfully carried out, and marring by their exaggerated use the legitimate effects of both the solids and the openings accompanying them.

In regard to dwelling-houses, the description already given of the old-fashioned store applies also to the average first-class residence in New York of the same period, from the second story up, except that the brick used was of finer quality and mould, and that marble occasionally took the place of stone. The window-lintels too were enriched with an additional moulding or two, and to the main cornice was added a frieze and architrave, and sometimes modillions or dentils. The girder and posts below the second story were replaced by a sunken basement, generally of brown freestone; and a high "stoop" led to the entrance door on the first story, the door being frequently finished with a frontispiece consisting of a couple of stone pilasters or columns of one of the Grecian or Roman forms, generally Greek Doric, surmounted by its regulation entablature.

But from the middle of the fifth decade most of the dwellings on the Fifth Avenue and adjoining streets were built in a much more pretentious way. As a rule their façades are not calculated to find much favor with a student who is passing under the dominion of the master who in the Fors Clavigera stage of his latter days, is at once so unlike and so like the Oxford graduate of a generation ago. Some of them have no merit except the negative one of unpretentiousness. More of them are obtrusive and meretricious. But not a few of them are by no means bad specimens of one form or another of Italian or French Renaissance. Among the best and quieter examples are a goodly number erected from the designs and under the supervision of Frederick Diaper. Not only do their façades show excellent adaptations of the plainer forms of the Italian Renaissance, but their interiors are planned with unusual care and judgment. Specimens may be seen on the north-east corner of University Place and Tenth Street, north-west corner of Fifth Avenue and Twelfth Street, south-east corner of Fifth Avenue and Sixteenth Street, north-east corner of Fifth Avenue and Eighteenth Street, north-west and south-west corner of Fifth Avenue and Nineteenth Street, and north-east corner of Fifth Avenue and Thirty-seventh Street.

The fifth decade of the century also saw A. J. Downing's contributions to the building art, and to its adjunct and sister art of landscape-gardening, or the art of creating landscape, as Horace Walpole called it. His efforts partook more largely perhaps of a literary than of an executive form, and in the direction of architecture no doubt helped very much to educate the masses toward a higher plane; but we are more apt nowadays to look for his major successes in the field of Le Nôtre, Capability Brown, and Repton. In addition to his publications on the treatment, both artistic and utilitarian, of the soil, many private grounds throughout the country, and Lafayette Square in Washington, still attest his skill in this direction.

Early in the sixth decade, another and the most striking innovation in architectural forms up to that time occurred in the erection of the Crystal Palace, a reduced imitation of the London structure, which was itself but an enlargement of the green-house, and in which was inaugurated the first of the world's expositions of which the Centennial Exhibition now progressing in this city beneath the shelter of the same kind of structure is, so far, the latest. The Main Building and Machinery Hall are by Jos. M. Wilson and Henry Pettit; Memorial Hall, Horticultural Hall, and the Judges' Hall are by H. J. Schwartzmann, to whom the decoration of the grounds is also to be ascribed, a surprising work considering its inchoate condition a very few weeks before the opening of the great show, and its completeness at the opening. The United States Government Building and Agricultural Hall are by James H. Windrum. All these buildings, except the Art Gallery or Memorial Hall, are as much works of engineering as of architecture, or more so; but the names of their creators are all included in the list of professional members of this Institute.

The Crystal Palace, being like its prototype framed of iron, was of course credited with fire-proof qualities; but a few years after its erection it burnt up like a scroll at the first touch of the flames. It inaugurated, however, the iron-and-glass epoch in our building-opera-

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tions, commencing with vault covers and step platforms, — the introduction of the thick hammered glass jointly used in these being simultaneous, — and ending with commercial structures that cover a whole block with an incredible number of tons of iron, very many of which are superfluous for constructional purposes, and most of which are in no way conducive to the real embellishment of our cities.

The end of the sixth decade saw the New York Central Park fairly under way. The topographical work, which in landscape-gardening on a large scale forms or should form the foundation of the subsequent treatment, had been outlined and the first rough steps of the work initiated by Gen. E. L. Viele, who was succeeded by a corps of engineers detailed to its various divisions, and including William H. Grant and George E. Waring, jun.; while the æsthetical treatment of the grounds was intrusted to F. L. Olmsted, whose work, where not interfered with by political huckstering, has in most of its principal features met with the commendation both of the public and of qualified critics. It was not perhaps possible to exercise sufficient forecast to meet all the contingencies of a community which during the late war developed so enormous a faculty for acquiring and spending money, much of which goes in the way of horseflesh and carriages; but comprehensive foresight is as much apparent in the general distribution of the grounds as judgment and taste are in its more detailed features. The architectural adjuncts of the park were designed and elaborated by a small staff of architects and draughtsmen; the masses, it is claimed, being mainly inspired by the consulting architect, C. Vaux. The architectural expression of landscape art, however, if subordinated, as it ought to be, to the effects of contour of ground and of vegetation, necessarily consists mainly, or at least in very large proportion, of detail; and for nearly all the clever and beautiful architectural detail the public is indebted to the fertile brain of J. Wrey Mould.

The seventh decade opened with the irrepressible conflict between the North and South, only to be allayed by the spending of much blood and treasure; but after the panic produced by the first shock there was, notwithstanding the high prices of land, labor, and material, an apparent determination on the part of the better class of land-holders to make use of the available architectural talent of the country to a greater extent than ever before.

A good deal of trained talent, as well as a vast amount of mere stone-cutter's work, had already been expended on mortuary monuments in Mount Auburn near Boston, Greenwood near New York, and other cemeteries. Prominent among such structures is a family monument — Gothic — in Troy, N.Y., by Henry Dudley, who has also been active in the production of church work. As connected with cemeteries, should also be mentioned the double gateway at the principal entrance of Greenwood Cemetery near New York, a most meritorious piece of sculptured and sculpturesque Gothic, by the Upjohns, father and son, with a lodge at each side, subordinate in purpose and therefore subdued in treatment. J. K. Wilson's entrance-lodge to Spring Grove Cemetery, near Cincinnati, is also noteworthy, but he has done still better work in his Dexter Monumental Chapel in the same place; which in its whole treatment, from the well-managed foundation story that supports the bold standards and pinnacles from which spring the flying buttresses, up through its successive stages to the elegant finishing *flèche*, expresses the aspiring nature of ecclesiastical Gothic as well as it seems possible for any building of its limited dimensions to do.

The war, as might be expected, greatly multiplied examples of mortuary monuments, while the pride of patriotism removed the site of many from the graveyard to the public park or square. They have generally resulted from the action of municipal or other associative bodies, desirous of paying honor to fallen constituents or comrades. The great majority of these exist in the North, where few towns or large villages are without their "Soldiers' Monument;" but the South, considering its depleted resources, has not been behindhand in honoring "the unnamed demigods" — to use Kossuth's fine phrase — who fell on its side. These monuments are sometimes more respectable from their associations than as works of high art; but on the other hand, one is sometimes surprised, in quite out-of-the-way places, at the well-cut emblems or the well-posed figure surmounting the graceful lines of the pedestal that so briefly tells its pathetic story. Many of them are the joint work of both sculptor and architect; but the one that heads the list in artistic and financial importance is purely a work of architecture. This is the Harvard Memorial Hall, by Ware and Van Brunt, in honor of the fallen graduates of that time-honored seat of learning.

As I have now brought this sketch up to a period within the professional memory of even the youngest of you, I will now recall under their several kinds some of the structures which have emphasized the progress of architecture among us, before closing, in brief terms, with a few deductions to be drawn from a review of the subject in its later phases.

I have adverted only casually to the buildings erected for federal purposes by the United States Government, because Mr. Wight, in his paper before alluded to, has treated of the subject; and Mr. Cluss, further on in this Convention, will necessarily cover an important part of the ground. Mr. Wight names the more prominent of the custom-houses, treasury-buildings, post-offices, etc., erected before the war.

During the war, the Government, requiring all its available treasure for military and naval purposes, did very little in the way of building. It was pleasant, however, to watch the construction of the Treasury-Building in Washington carried calmly on, while the enemy was within gunshot of its treasures. You are all familiar with the notable condition of matters connected with the architectural service of the Federal Government since the war, — the enormous sums expended on it under the Treasury Department, and the transfer of the supervising power, which includes, in the badly organized administration of the service, the functions of design, from the former Supervising Architect of the Department, to a member of this Institute, W. A. Potter. You know also that our last Convention occupied itself in discussing the details of a bill looking toward the true interests of the country, as relating to economy, construction, and æsthetics in its architectural service. You have doubtless heard that this bill, with an alternative of Mr. Potter's covering the same points as the Institute's so far as he thought it expedient to press them, has received the attention of Congress, and that both have been referred to an appropriate Committee. For the progress of our bill in Congress thus far, we are mainly indebted to the Hon. Abram S. Hewitt, who has already, as Secretary and Manager of the Institute founded and endowed by his father-in-law, Peter Cooper, done so much for the development of rudimentary and industrial art in America, and for the usefulness and happiness of multitudes of pupils and workers in that field. And further, while most of you will no doubt acknowledge the superior merits of the designs prepared and published by Mr. Potter while in office, you will also recognize, in the marks of haste in some of them, and in their general sameness, the necessity for supplying those opportunities for securing variety and finished study, the absence of which he deplored in his official report to the Secretary of the Treasury, and which the Institute in its bill endeavored to indicate practicable methods for supplying.

The most prominent of the public buildings erected since the war, for state, county, or municipal purposes, are still unfinished; but a judgment on the portions already up may be supplemented by reference to the prepared drawings. The Philadelphia Public Buildings by J. McArthur, jun., will be the most magnificent and costly, as well as the largest of the Renaissance examples on the continent. The New York State Capitol was also designed and the principal portions built in Renaissance by its architect (or till quite recently so) Thomas Fuller, who with a partner, Jones, was the architect of the most prominent of the well-known and much-admired new Canadian Government Buildings, in Gothic treatment. A City Hall in Providence, not yet completed, and so fenced up that but little of it can be seen, is by S. J. F. Thayer; and one in Baltimore by George A. Frederick is creditable alike to the architect and to the municipality (at the head of which is the grandson of Latrobe) that built it. They are both in Renaissance, and the material of both is marble. Iowa, Illinois, and Michigan are all having State-Houses built, the first from the designs of Henry L. Gay, the second from those of

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Cochrane and Piequenard. The cornice and dormers of the latter are of terra-cotta. Of public buildings in Gothic forms, the highest rank, whether artistic or financial, must be given to the Connecticut State Capitol in Hartford, executed in marble by the younger Upjohn. I shall have occasion to revert to it before closing. A District Court-House nearly completed, by F. C. Withers, in New York, adjoining Jefferson Market, and the design for one by Stone and Carpenter, now going up in Providence, are both noteworthy. The groundwork of treatment in both is the so-called Gothic. In Withers's work there are very apparent marks of that quality of working from the inward to the outward — from the plan to the elevation — which, in opposition to the classic custom, is so marked a feature in the best mediæval work. The two main façades are admirable, and with a corner tower from which they recede at a rather acute angle, present a most artistic combination. The outlines of the tower-roof, however, are not altogether satisfactory, especially from a distance. The eaves do not project sufficiently, and the fascia and members between them, and the gargoyles at the angles, are not treated nearly so well as in a similar case by one or both of the Upjohns, viz., the tower of the school belonging to and nearly opposite the rear of Trinity Church, which with its columnar supports so well redeems the rich and correct but flat monotony of its substructure, and forms a most beautiful object. But below the gargoyles Withers's tower, as it is approached from upper Sixth Avenue, rises up in noble lines, of circular plan most of the way, but square at top, from the subjacent desert of masonry. The joint Court-House and City-Hall in Chicago bids fair, in the quarrels among officials and architects to which it has given rise, to make as great a scandal in architectural annals as has already been caused by the new Court-House in New York, worth, for material and workmanship, at present prices, perhaps a little over a million of dollars.

The prisons of the country have hitherto yielded little to the æsthetical side of the building-art, nor probably is it well that they should. Exception may be made in favor of the city prison in New York, commonly called "the Tombs," by the elder Haviland, a good example of Egyptian design. The prison portion of Withers's Court-House, in its plain and subdued treatment, as compared with the part devoted to the judiciary, is from that fact all the more in artistic congruity with the latter. A paper is promised this Convention on prisons and penitentiaries, by a member of the Institute from Memphis, Tenn., Mr. J. B. Cook.

Among recent important ecclesiastical structures distinguished for artistic merit, may be mentioned the following: In Philadelphia: The Second Presbyterian Church, Gothic, by the late H. A. Sims, — an admirably managed production, with a fine tower, and a series of columns in the interior, which, whether as regards design or variety and richness of material, is in a high degree satisfactory; the Roman Catholic Cathedral, by N. Le Brun, a faithful and attractive rendering of Roman architectural forms. I have not seen the inside of a church in Broad Street by Furness and Hewitt, but its exterior is one of the best, as it is also one of the quietest, pieces of architectural art developed by that promising firm. In Boston: Two prominent Unitarian societies have built during or since the war; that once under the celebrated Dr. Channing having been served by Arthur Gilman with a rich structure of the Roman Corinthian type, the interior evidently suggested by that of the church of the Annunziata at Genoa; and the other, called the First Church, getting from Ware and Van Brunt a carefully considered building of Gothic motive rendered grammatically in the main, but with a leaning toward the latter-day freedom of expression. The younger Upjohn has also contributed one of his best works, a Presbyterian place of worship, — Gothic of course and of traditional rendering. Trinity Church by Gambrill and Richardson, founded on the Romanesque type, with however a very unconventional rendering throughout, especially in the treatment of the detail, will when completed be one of the largest churches in the country, and judging from the drawings prepared, will no doubt also be one of the most striking in its artistic attributes, especially as regards the interior decoration, and externally the massive central tower with its offshoots. Another church almost adjoining this, by the same firm, commands attention by its high square tower, around the top of which runs a band of colossal sculpture giving it, in this country, a novel and special character as a work of decorative architecture. In New York: The Collegiate Dutch Reformed Church, by Wheeler Smith, embraces many rare and beautiful combinations in detail. St. Thomas's Church, by our President, the elder Upjohn, presents an interior arrangement suggested by that of Ely Cathedral; and Dr. Hall's church, by C. Pfeiffer, conforms, in the disposition of its interior, to the most practical way yet devised for meeting the congregational needs of a Protestant denomination, at least of a non-ritualistic one, viz., that of a theatre. These are all in one type or other of the so-called Gothic. The Temple Emanuel, also in New York, by L. Eidlitz, is a reproduction of Saracenic forms, and in the abundance of delicate carving accompanying its somewhat stiff masses shows a very appreciative and able adaptation on a small scale of its main prototype, the Alhambra; while in the turrets that top out the composition, the inadequate constructional qualities of the school are acknowledged, and the airy grace of their light columns and roofs is much hurt by the intrusive iron tie-rods at the spring of the arches.

The educational establishments of the country have been operating largely in building since the war; and indeed, the various stages of architectural achievement from the early settlement of the country until now may be gathered at a glance from the various structures embraced in the appanage of Harvard College, better than anywhere else I know of. The work of Wight, Russell, Sturgis, Cady, and Hunt is illustrated at Yale; and Columbia has recently added to itself a School of Mines, with a modern Gothic façade by C. C. Haight, which, though (without doubt purposely) kept down to a low key, is altogether too vital for the body-of-death structure to which it is tacked, — a large barn with central colonnade and side-wings, all looking as if in lath and plaster, and originally used as an asylum — it is understood, and as it is charitable and satisfactory to believe — for the blind. The Massachusetts Institute of Technology is especially interesting to us, outside of its rank as a structure, in being the home of the first college or school of architecture in this country; and the opportunities afforded by his leadership of its architectural curriculum have given Prof. Ware much material toward the enrichment of the published Proceedings of the Institute, in the shape of his reports written on behalf of the Committee on Education. Cornell University and Syracuse University have also been built since the war, and have successively followed this example by establishing chairs of architecture under Profs. Babcock and Comfort. The High School and the St. François Xavier Female Academy in Chicago are both decorated with terra-cotta of American manufacture. A fair rendering of modern Gothic is to be seen in a High School in Cleveland by Heard and Blythe. The Indiana State Normal School, as designed by J. A. Vrydagh, is a somewhat stiff but creditable experiment in the adaptation of brick to a German rendering of modern Gothic. The junction of the façade lines with those of the roof and the commonplace bracketed cornice are however more suitable to a frame house with a "French roof" than to a building of such pretensions.

Of hospitals and asylums of various kinds, a large number have been projected since the war. The temporary pavilion system of hospitals recommended by the Sanitary Commission, and largely employed by the Government during the conflict, as also by the Germans during the war with France, has not been generally adopted, at least in the large cities, though it has been used in conjunction with permanent administration buildings in some of the smaller centres. In asylums of all kinds, utility is or should be the *sine qua non*. And the enormous areas and contingent expenditures required by those for Federal and State use leave little margin for exterior decoration as such, without intrenching on means better employed in spreading and perfecting interior appliances for the amelioration of human suffering and misfortune. At the same time, the mere expanses of exterior surface supply the elements of grandeur, if not of elegance; and this opportunity has not been lost in some of the later designs for this class of building. The long mural stretches, the heavy shadows thrown from deep angles and offsets, the diversity of sky-line

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afforded by the different heights of the combined structures, the tall wide shafts for purposes of firing and ventilation, — all these, combined with the variety of tint and texture afforded by the different materials employed, have been more or less taken advantage of by — for instance — Gambrill and Richardson in the Insane-Asylum at Buffalo, A. C. Morse in an Asylum at Providence, and Hunt in his Presbyterian Hospital in New York; though the spirited and artistic lines of the last, which is studied with relation to decorative effect, more than the others, are marred by the obtrusiveness of some of the dressings; white granite against red brick, and particularly the top and bottom jamb-stones of the windows, giving the restless effect, at some distance off, of so many little white flags being distractedly waved. The street façade of George B. Post's New York Hospital is however, it is obvious, still more deliberately designed as a piece of art-work, and is one of the most striking fronts in the city. In its general execution however, it does not give with customary emphasis that impression of specially studied construction usual in his work; and most eyes will probably be offended, on first sight at least, by the apparent squattiness of his doorway, for not only is its arch stopped at the second floor, instead of being carried above it, as frequently practised in such cases; but the vault-like effect is increased by the refusal to stop the stylobate — if the support of such low-relief pilasters may be so termed — of the wings on the flanks of the central pavilion, and to bring down the pilasters of the pavilion to the water-table immediately above the sidewalk. But the effects, both of form and tint, around the archway, in the brick and stone work, in the polished granites of blue and red, and in the white marble caps and bases, are extremely pleasing. The party-colored mosaic work of the wings in brick and tile is well designed; and the lines and decorations of the roof are much quieter than usual, and thus harmonize well with the small scale of the façade design. The New England Hospital for Women and Children, in Boston, by Cummings and Sears, though a comparatively small work, has also evidently received a careful and artistic study as regards external detail. In respect to interior arrangement, the Roosevelt Hospital, by Pfeiffer, has the reputation of being one of the best planned in this country. One of the largest insane-asylums in the Union is now reaching completion near Morristown, N.J. The designs for the Central Ohio Lunatic Asylum, and the Raleigh Penitentiary in North Carolina, are both by Levi T. Scofield, and are both founded on the Norman type. The Cincinnati Workhouse, by Anderson and Hannaford, shows a design of very unequal treatment, the gambrel-roofed central structure being a very tame performance, considered artistically, compared with the turreted pavilions at each end, and the buttressed and machicolated series of bays connecting them.

The building of the Academy of Design in New York, — miscalled National, — by P. B. Wight, was coincident with the first two or three years of the war. It excited the attention both of specialists and the public; and while it is easy to see how completely the young disciple of Ruskin was under the spell of the master, both as respects the merits and the shortcomings of the structure, which at once recalls the Oxford graduate's first architectural love, it is also easy to see in how masterly a manner the pupil followed him. In execution the building as it stands does not fully express its author's intentions; for some of the most decorative features of the design have never been completed, e. g., the filling in of the tympanum at the main entrance, and of the circles on the flank façade, while inside the capitals and bases of the columns (except one) belonging to the beautiful staircase gallery are still left *en bloc*. Since then several of the large cities have built noticeable structures under the same name, which though esoterically correct is, so far as the general public is concerned, somewhat of a misnomer, for the masses know them chiefly as halls for the exhibition of pictures and statues. The same may be said still more decidedly of the so-called Academies of Music, of which a number had been built in the decade before the war, and which are, I believe, in reality as well as exoterically, simply opera-houses and theatres. The Academy of Design in Brooklyn, built within this decade by Cady and Congdon, shows a finely decorated façade of advanced Gothic, very cleverly managed, and singularly expressive of the purpose of the structure, in immediate contiguity to an Academy of Music built at the close of the sixth decade, by Eidlitz, and displaying a front of German Gothic, with a good deal of artistic effect *per se*, but of treatment so severe and sombre as to suggest a monastery or prison, rather than a resort for recreation and festivity. *En passant*, it may be remarked that Brooklyn possesses a rather unusual architectural combination in these and contiguous pieces; for directly opposite them is Wight's Mercantile Library in still another phase of modern Gothic, while round the corner is the Church of the Holy Trinity, a most creditable specimen of grammatical mediæval work, begun in the fifth decade by Minard Lefevre. Not less striking than the first-named Academy of Design, though a very dissimilar rendering in its individualistic Gothic, is the last-built one, designed by Furness and Hewitt, in Philadelphia.

Since the war, too, Boston has from the designs of Sturgis and Brigham built an Art Museum by private subscription, thus insuring exemption from the evils, especially fatal to art in any of its appliances, of dependence on political huckstering; and New York is having one built, with much less satisfactory results, from the public funds at the disposal of the City Comptroller, after the designs, well conceived so far as exterior effects in their entirety are concerned, of Mould. It is understood that Philadelphia has followed, and that other cities are preparing to follow, in similar work.

Various branches of the wide-spread Young Men's Christian Association have had buildings put up in a number of the cities; that in New York by Renwick and Sands being noticeable, as presenting somewhat novel modifications of Renaissance traditions.

The same firm presented New York about the same time, that is, toward the end of the last decade, with another good example of a rather free translation of Renaissance, in Booth's Theatre, which has also the reputation of having an unusually well contrived interior.

The Masonic Hall in Philadelphia, by Windrum, is a costly performance in granite, of Norman treatment; and the well-designed Renaissance façade in similar material, by N. Le Brun, of a building devoted to the same uses in New York, is, as becomes its name, an uncommonly excellent example of thorough masonry.

So much briefly for a few instances of the secular structures devoted to the associative uses of the community.

The various business representatives have also been busy with the trowel since the war. At their head, and as a connecting link between agencies which are essentially *pro bono publico* and those which have their origin mainly in self-interest, must be placed that potential instrument in the conduct of modern society which has been very gradually growing up for the last three hundred years in civilized communities; that agency which daily brings before us

> "The herald of a noisy world,
> . . . Messenger of grief
> Perhaps to thousands, and of joy to some," —

who gives us

> "News from all nations,
> Houses in ashes, and the fall of stocks;
> Births, deaths, and marriages,
> The grand debate,
> The popular harangue, the tart reply,
> The logic and the wisdom and the wit," —

that agency which now forms an important if unofficial factor in all civilized governments, and without a representation in which no person, or body of persons, having relations with the public, can achieve maximum success. This unperfunctory governing influence — the newspaper press, journalism — has within the last two decades begun to emerge from the dingy corners of the printing-house, and to avail itself of the ministration of art in its dwelling-places. Yet, again referring to New York for illustrations, I can, when it is intended to cite examples not from the public's traditional repertory, but from that which the well-trained modern architect recognizes as representing the current vitality of the best-endowed or best-trained among the profession, only say of the *Evening Post* Building that its interior arrangement may possibly be all that is desired, but, so far as the two façades are concerned, each represents a thin slice of *pseudo*-Victorian Gothic work, and that both are vastly inferior

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to the unused design projected for the site by George Hathorne; while of the contiguous *Herald* Building it may perhaps, without undue indulgence, be said that its first story indicates a possibly praiseworthy fidelity to that useful metal which has best served the world, and which has had so large a share in the prosperity of journalism; and that the incongruous material of the superstructure — marble — may perhaps be regarded as a well-meaning attempt to atone for its rendering. But the result externally is simply carpenter's Renaissance of the baldest kind. Of the three structures of any architectural pretensions, among the many representing the newspaper press, that line the neighboring double triangle sometimes called Printing House Square, viz., the *Times*, the *Staats-Zeitung*, and the *Tribune* Buildings, only the last two will bear inspection from the point of view of this sketch. The building for the German newspaper, in dark and light granite, is by Henry Fernbach, and is a large, well-placed, and imposing structure, most faithfully and most harmoniously rendered in Renaissance. The *Tribune* Building is a remarkable pile, and I am accustomed, in hearing it discussed, to accept it as a gauge of the critic's architectural art conditions. The architect or amateur who has got beyond mere academic influence, and has learned to accept Ruskin's building-odes only as he accepts Victor Hugo's prose lyric on "frozen music," will recognize its great intrinsic merits, through its obvious superficial defects; but the public, accustomed as even the most cultivated grades of it are to look at art only or chiefly through the mediums of tradition, association, and sentiment, — witness the Easy Chair's query as to the old or the new Trinity tower and spire (of New York) being the better, — will be long ere it will take it, except perhaps the tower, into full favor. The architect, Hunt, labored in designing it, under the disadvantage of being compelled — ground-space being too valuable to throw away — to accommodate his principal façade to two planes joining at a very obtuse angle. But turning inherent disadvantages into special means of displaying skill is one of the characteristics of a master; and by good management of his main entrance way, and of the projecting substructure of the tower over the entrance, he succeeds in giving the impression, from a front view, of a façade built on a single plane — a very desirable achievement, the advantage of which, however, is not gained on approaching the building close to it, and from the side, when half of the front is lost to the eye. Both the main lines and the subordinate lines are instinct with the artist's usual vigor and refinement; but as in his Presbyterian Hospital, the contrast between his body-tints and those of his trimmings is too violent; and as is not uncommon with him, some of the outlines of his secondary masses, though beautiful in themselves, are somewhat extravagant and *outré* in their relations to the primary masses. Witness the *quasi*-entablature over the doorway, though the columns supporting it are more conventional than usual with him. All this tends to vitiate the repose and stateliness which might otherwise have been more completely secured, and which one has the right to expect in a structure of such magnitude and evident importance. Picturesqueness is not so much to be sought for in a large structure — and especially in a high one — as that expression of repose which satisfies the public eye with an impression of stability and safety. The strong foundations and thick walls are out of sight. The *Tribune* Building is a very high one in reality, and looks disproportionately so from the sides, owing to the double-planed principal front and to the non-erection of a great portion of the projected façade on Spruce Street. The "tall tower" above the main roof, if it may not be accepted as perfect of its kind, is defective in but a single feature, and that a subordinate one. The dormer windows, especially when seen close at hand, are too high for their width (too much care probably being taken to avoid the opposite and usual fault), and their cap-stones might have been made lighter with advantage. But otherwise this tower is one of the most graceful examples extant of the current treatment which Hunt may be said to have introduced to this country, by which Neo-Grec lines are infused with Gothic sentiment; and whether at hand or at a distance, its clean-cut, exquisite outlines against the sky produce one of the most beautiful architectural effects anywhere to be seen.

The carrying and railroad interests are represented by a number of costly structures, among which the American Express Company's Building in Chicago, designed by Gambrill and Richardson of New York, and supervised by Wight, stands pre-eminent for massive artistic effect. The railroad-station in Providence, by Peabody and Stearns of Boston, is of satisfactory result, and has a good Victorian machicolated or rather *quasi*-machicolated tower. In New York, the freight-depot covering old St. John's Park, and the Grand Central Depot up town, are imposing from their size; and the latter presents interesting constructional features in its St. Pancras-like iron trusses supporting the bow-roof of its vast car-terminus. Both structures are also interesting as examples of lost opportunity for æsthetical effects on a striking scale. Though generally of perishable material and slight construction, the local stations of some of the railways should not be overlooked; for a good deal of artistic training has been expended on them. There is a very effective one in stone and wood, by F. G. Thorn, at a Pennsylvania way-station called Ardmore.

Among exchange buildings erected since the war, perhaps the most noticeable is a characteristic design of Hunt's for the coal and iron trade of New York. The raking basement lines usual in his compositions, and so expressive of strength, tell in this structure with good effect, and the exterior generally carries out and up, with solid grace, the promise of the Cyclopean foundations; but the detached entablature (if it may be called an entablature) surmounting the high-lifted columns of the frontispiece is in its isolation a questionable piece of construction, as regards the sentiment that demands not only the assurance but the appearance of solidity and safety; though in reality, its immediate connection with the main building would not add a particle to the stability of either, while the desirability of the arrangement for purposes of fenestration and interior arrangement is apparent. But indeed this whole frontispiece, though beautiful in design, is somewhat unsatisfactory, considered as construction. Perhaps the under-cut supports of the columns may be justified where adequate projection for a base on a narrow sidewalk is unattainable; but the slight *quasi*-entablature does not seem to give a sufficient *raison d'être* to the strongly assertive columns, with their high, thick, polished shafts, and their large, beautiful capitals.

The enterprise which harnesses the modern Puck to its triumphal car, and literally puts a girdle round about the earth in much less than forty minutes, has been most notably illustrated in architecture, by Post's Western Union Telegraph Building, a bold and towering performance in Renaissance of the modern type, which he has done so much to extend, and of the sub-type partially suggestive of an engineering standpoint, which has become peculiar to him. While the great cleverness of the whole design will be generally acknowledged by experts, objection may be made by some that the superstructure is not so refined as the basement and first story; while the roof is rendered picturesque at the cost of repose, and in some of its ornamentation, and in its sky-lines, is not without a suspicion of coarseness. It is to be regretted too, that the quieter-toned stone selected by the architect for the banding should have been replaced, for economical reasons, by that which has been used.

The banking-corporations have for the last thirty or forty years afforded much employment to architects. This is especially true latterly of the banks for savings. Outside of governmental and ecclesiastical structures, there is probably no more monumental — and no more misplaced — building in the country than the Williamsburg Savings Bank recently finished by Post, the interior polychromatic work being, however, from the designs of Wight. Both the exterior and the interior effect of the dome are very imposing; and the rest of the work, in a Renaissance tinged with Neo-Grec feeling though motived by Roman examples, is not unworthy of it. The Dry Dock Savings Bank in New York, finished within a year by L. Eidlitz, is perhaps the most pleasing example of its author's characteristic manner of interpreting German Gothic to modern eyes, and along with his usual apt appropriation of good but somewhat monotonous detail, shows more mastery of outline and cosmopolitan feeling than have hitherto distinguished his generally interesting and clever but somewhat stiff and unequal work. The squaring of the

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plan on the site (which is considerably off the square) seems to indicate a facile building-committee, and cleverly cuts a Gordian knot with the least expenditure of trouble to the designer; while at the same time the unusual arrangement calls attention to the building. The Park Bank in New York, built during this present decade by Griffith Thomas, probably finds little favor with purists of the modern school; but it only follows abundant precedents in famous examples of its type, for such solecisms as trussed keystones, and pediments broken into and deeply disembowelled as it were, for the deposit of consoles, vases, statuary, etc.; and it is, notwithstanding them, a rich and spirited production in French Renaissance — one of the best examples of its florid phase to be found among us, and the more effective perhaps from the fact that the *Herald* Building touches it on one side, and the *Evening Post* Building approaches it on the other. The special execution of the statuary introduced into the façade of the Park Bank does not of course affect the quality of the design; but the difference between stone-cutter's and sculptor's art is illustrated by comparing the figures with those of the marble group by J. Quincy A. Ward, in front of the Equitable Insurance Building a few rods off.

Much of the best-trained qualifications of the architect have, during the last three decades, been expended throughout this country, as well as in its neighbor the Canadian Dominion, not only on banks but on insurance-buildings. One of the most respectable renderings of free Italian Renaissance in New York, on the southwest corner of Wall and William Streets, was built for two insurance-companies at the beginning of the sixth decade, by Diaper, the architect also of a number of the adjoining banks. The massive building for the Equitable Life Insurance Company in New York, erected just after the war from the designs of Gilman and Kendall, and recently extended, shows two façades of large and harmonious composition in Renaissance elements; the one on Broadway being beautified by some of Ward's sculpture, as I have just mentioned. The Philadelphia branch of the New York Mutual Life Insurance Company, by Henry Fernbach, is among the best examples, anywhere to be found of carefully studied, picturesque and thoroughly executed work in its type of the Renaissance.

Allied to banking and insurance buildings, a new description of structures has come into vogue within the last dozen years, for the safe storage of securities, jewels, plate, and other valuable effects. At the head of these, both as regards size and artistic rank, whether of exterior or interior, may be placed the Guarantee Trust and Safe Deposit Company's building, in front of the historical Carpenters' Hall in Philadelphia. It is by Furness and Hewitt. Another interesting building devoted to the same uses is one in Baltimore, from the designs, it is understood, of E. F. Baldwin. The façade is not an elaborate one, but presents in its rendering a clever and pleasing combination of Romanesque, modern Gothic, and Neo-Grec.

Another noticeable Baltimore design is the Rialto Building, by Niernsée and Neilson. The effect is graceful up to the top of the large round-headed fenestration of the upper story, but is somewhat meagre and unsatisfactory above that.

The extent of the national territory, and the quick returns of commercial enterprise and capital, tallying with the inherited nomadic tastes of the masses of the population, had gradually, since the early part of the century, developed the inn-keeping system of the country beyond that of perhaps any other; and the fact that, among the new acquirers of wealth, there were many whose social habits were unformed, and to whom hotel life presented attractions otherwise out of immediate reach, created a local patronage of a permanent or semi-permanent character, which hardly exists in the older trans-Atlantic communities, and which added largely to the pecuniary rewards of tavern-keeping. By the beginning of the sixth decade, consequently, every then existing large city had at least one of what both proprietors and public delighted to call "palatial hotels." So far as concerned dimensions, interior appliances of stereotype furniture and upholstery, and a very abundant larder, — not always thoroughly supplemented in the kitchen, — these caravanseries successfully appealed to the pride, stomachs, and pockets of their myriad patrons. St. Louis's Lindell House once bore away the palm for bigness; but this was soon transferred to the Occidental Hotel of the great city which now stands by the Golden Gate of the Pacific, and which consisted of but a half-ruined Spanish convent and a few adobe huts when the Tremont House of Boston and the Astor House of New York were already past their prime. But during the present decade, and since its great fire, the building-interests of Chicago have paused in their free fight over its projected dual Court-House and City-Hall to seize the sceptre of hotel-vastness from San Francisco, — with doubtless a secret pang that the larceny could not be committed except at one remove from its rival on the Mississippi, — and to divide it, true to its double-building instincts, between the Grand Pacific Hotel and the Palmer House. But hotels nearly as large now abound in all the principal cities. In New York their name is legion. The wide intercolumniated hallways and staircases of some of them have perforce given occasional expression of interior effect; but so far as exterior is concerned, notwithstanding extent of surface often exceeding that of the largest palaces of Europe, none of them can fairly claim the architectural rank which has been reached by many examples of structures devoted to the other purposes of the community. Exception may be made in favor of the dome of the St. Charles Hotel, the landmark of New Orleans, — built, I believe, during the last generation, — and the new Brunswick Hotel in Boston, by Peabody and Stearns, of Gothic motive with modern treatment; but such work as Sir G. G. Scott's Midland Hotel has as yet found nothing in the way of cis-Atlantic imitation.

The apartment-houses which have come into fashion since the war have fared better from an artistic point of view. The towering and richly varied masses of the Stevens House, a building, and a really monumental one, of this class in New York (with a charming addendum to it in the shape of a small façade on an adjoining block in Broadway) form one of the most notable examples of the distinctive style of its architect, Hunt. He also designed the Stuyvesant House, which inaugurated the system in New York, — the geographical limitations of which city have long rendered this kind of dwelling a desideratum. I think however, that the Hotel Pelham in Boston takes precedence of all other houses of this kind within the Union in point of time. The apartment-house has been in vogue for centuries throughout Europe, except in England, where it has never found general favor; and for many years a number of the better-trained architects in this country pressed the subject on the attention of landholders without success. The question in its various aspects was quite exhaustively discussed by E. T. Littell, in a paper presented to the Eighth Annual Convention of this body, which was afterwards published in the *American Architect and Building News*.[1] The cry of "tenement-house" was however raised by the tenant class, and it was long before the landlords ventured the experiment. But the formation, by the natural processes of business and social elements, of a cultivated and travelled class, not only among the money-making rich, but much more largely among those of inherited and more moderate means, and the rapidly increasing and disproportionate value of land, have combined with other causes to make a market in some of the cities of the Atlantic seaboard for a large number of compact dwellings in suites of small rooms on one level, approachable by a common staircase and under one roof; and it seems probable that the apartment-house thus created has, in all its grades, taken permanent root in our soil. They abound in New York, their appointments ranging from the most modest to the most luxurious; and some recently finished, as the Albany and the Saratoga, are very large. For some reasons of social economy, however, it seems very doubtful whether it is desirable that the apartment-house should extend to cities which like Philadelphia have plenty of room to spread on, and where landholders are content to build small houses adapted to all grades of habits and to all purposes. Under the various arrangements of these apartment-houses, tenants may choose every grade of living between that of the hotel "on the European plan" to that of the strictest domestic independence and privacy. In New York, and

[1] Of Feb. 19, 1876.

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probably elsewhere, landholders have found it pay to alter old dwellings into this latest local type of residence. The Haight House and the Knickerbocker are examples of this.

Partly devoted to the purposes of an apartment-house for bachelors, is the just finished Racquet Club House in New York, by A. H. Thorp, the façade of which is interesting as a specimen of what may be done with common brick. Not without some minor crudities, it is, on the whole, a performance as spirited as it is novel, and altogether creditable to its young architect.

Within the present decade, the two great fires of Chicago and Boston have occurred, both giving rise to a new city of commercial buildings. Some of these in Chicago as designed by Wight, and produced by W. L. B. Jenney and others, show very artistic handling; while there are several which defy all classification, past, present, or embryotic, and are like nightmares. The prominent Chicago architects have largely availed themselves of the opportunity for artistic decoration of a high order, at available rates, afforded by the Terra Cotta Company in their city, at the head of which is S. E. Loring, a member of our Institute. The spirited cornice, the fine colonnaded dormers, and indeed all the decorations of Wight's Foundling House, as well as those of his Springer Block, are in this material; and Jenney, as well as Burnham and Root, have employed it effectively for mercantile and domestic purposes. Probably one of the best store façades in the country is that by George E. Harney, on the corner of Broadway and Bond Street in New York. It has a Norman motive as its artistic foundation, but is carried out with a liberal modern rendering. The iron problem in its artistic relations is partially met on its ground floor with somewhat less success perhaps than obtains in the other parts of the building. Cincinnati possesses some fine store fronts. The double façade of a corner building designed by Wilson — and opposite the Burnett House — is an instance. The effect, at once massive and graceful, of the two lower stories is excelled, in my estimation, by no business building in the country. The same architect is the author of another fine front having a very elegant attic story, with dwarf columns serving as imposts to a series of window archivolts. Walter and Son have produced in the same city an unually good example of a colonnaded front with round and low arched openings. D. Lienau has given New York an excellent business front, or rather two of them, divided by the corner of Crosby and Howard Streets. The characteristics of McArthur's business façades in this city are familiar to most of you. The attractive productions of Norman Shaw, in England, have largely recommended the so-called Queen Anne style to the adoption of our younger architects. An example among business buildings is given by Wheeler Smith, on the site of the old Dutch Church in New York. The lower portion presents a number of pleasing features; but the diminutive round central pediment, and the miniature ones above the pilasters of the attic story, show the defects of meagreness and spottiness seemingly inherent to the style as heretofore practised. The iron problem, as applied to mercantile façades, has been essayed in New York by Hunt, Renwick, Russell Sturgis, and others; and they have succeeded more or less in expressing the nature of the material without debasing their compositions, as usual, by sham construction in imitation of stone. Two wide iron fronts adjoining each other on Broadway near Broome Street at once exemplify perhaps the maximum of success that has so far been attained in such expression, and the versatility of their architect, Hunt, — elsewhere seen, for instance, by a comparison of the restless, aspiring vitality, the picturesque massing, and the bright double-tinted surface of his Presbyterian Hospital, with the low horizontal lines, the single subdued tint, the thoroughly expressed repose, and the quiet but elegant simplicity of its immediate neighbor, the Lenox Library. Even with the deprivation of their original polychromatic surface, by which the constructional ironwork of the façade is so much heightened, the two store fronts just mentioned expressed their material at a glance; yet nearly all the lines of one of them are genuinely Moorish, which, of established architectural forms, is decidedly the best, perhaps the only fitting one for such work, while the other is motived on the Ionic column of the Scamozzian-capped type, and all its lines of solid and void, from water-table to crown mould of cornice, are as different as possible from those of the other. After all, however, it will probably take a generation to decide fully whether iron on artistic grounds is to be relegated, as Ruskin and Seddon would have it, to the simple duty of constructive skeleton-work, or to take rank with stone for purposes of exterior expression deeper than mere surface-rendering.

The new-made ground on the Back Bay of Boston is covered with dwellings which perhaps contain on the whole more study and finish of well-trained architects than any other equal number of city houses in the Union. But of dwelling-houses, whether in city or country, it seems difficult to speak even in the general way necessitated by the limitations of this sketch, there are so many of them. Yet in some respects they represent American conditions more completely than any other kind of structure, and a large portion of the qualifications of our architects is absorbed in them, particularly in those designed for rural occupation.

Among the most important of city houses that have been raised since the war, should be mentioned the costly residence of Mr. Stevens, on the corner of Fifth Avenue and Fifty-seventh Street, in New York, by Harney. Its ample dimensions, its several towers and particularly its round tower, and some of its other features remind one of a French château; but it is full of modern feeling, gracefully rendered. The interior, its spacious, lofty living-rooms, its mosaic hall floor, its gallery, its lace and leather hangings, and its general appointments, are luxuriously worked out. There are several house fronts in New York, well studied in Renaissance by C. W. Clinton; and Park Avenue and its neighborhood, in the same city, have rather a monopoly of artistically designed houses, among which may be noted one on Thirty-seventh Street, by E. T. Potter. Dr. Bumstead's house in the same neighborhood, by Ware and Van Brunt of Boston, and Mr. Brimmer's house in Boston, by their old preceptor, Hunt, are examples at once of a desirable interchange of architectural compositions, and of some of those leading features which, with much diversity of detail, are gradually crystallizing into what will probably be some day accepted as the vernacular style of domestic city architecture, and which is founded on the combination of so-called Neo-Grec lines with feeling expended on one or more of the numerous types of Gothicism. But so far it is essentially eclectic, as all architectural art must be that is vital and growing, among producers versed in art history; and according to the bias of those who, consciously or unconsciously, use it as a foundation, every leading architectural development from Athenian times to the latest phase of Renaissance is more or less interpolated upon it.

These vernacular traits are being developed still more rapidly and markedly in our country houses than in our city ones; for the piazzas or verandas on which, owing to our climate, so much time is spent in summer, become factors of such importance in the composition that they give occasion for developments unknown to the English rural houses on which our own are in some of their main, and especially their exterior, features modelled. In some experiments which found a congenial atmosphere in Newport, Hunt was one of the first to invest comparatively inexpensive cottages and villas with some of the attributes of an indigenous and coherent art; and from the firm of a pupil of his, Gambrill and Richardson, we have had some of the latest and best developments in this kind; one or two of their most recent designs that have come under my notice showing a considerable infusion of the latest fashion, the so-called Queen Anne style. One of the best recent designs for a country house in this last mode may be seen in a late number of the *New York Sketch Book*. It is by Bassett Jones, and is called "A Suggestion for a Country House on the Hudson." The Queen Anne designers are careful to preserve the small panes of window-glass which necessarily prevailed two hundred years or so ago. They do this on the ground that the frequently recurring bars to hold them are more picturesque in composition than their absence would be. It will however be as difficult to persuade an archæologist that the Queen Anne architects would not have preferred a large pane of glass to admit light and look out of window, if the art of making large panes had been practised, as it would be to persuade him that an

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Athenian architect, if restored to this world, would prefer the rules of Alberti or Serlio for finding a moulding rather than the intuitions of his own artistic eye. Among the most important of our country houses, as regards finish and cost, though the external treatment of neither is very elaborate, may be mentioned two in Connecticut: one by Lienau for Mr. Lockwood, and one for Mr. Brooks by Holly, the latter of whom has done much toward improving the popular taste in the series of country houses of all grades that he has built. The suburbs of Cincinnati show several noteworthy country houses; among them one for Mr. Schoenberg in marble, by Wilson, — a fine adaptation of Gothic to domestic uses and modern taste, — and a skilful Elizabethian example in stone, by J. W. McLaughlin, for Mr. Shillito. Several by A. C. Nash show a fine management of the mansard roof, which, since its introduction by Lienau and Marcotte on the house built by Madame Shiff in New York some twenty years ago, has dominated the superstructures of this whole land as completely as the Greek temple did at one time; and which, while so satisfactory in well-trained hands, has done so much in incompetent ones to degrade the taste of the community. There is a well-schemed house in stone, in the same place, by William Tinsley, for Mr. Probasco, who presented the city with the fountain named after him, the finest on the continent, and perhaps the chief ornament of Cincinnati; though as a work of sculpture, with but slight architectural elements in the way of pedestals, etc., this sketch can barely claim the honor of its rightful inclusion. The country house of Mr. Constable, in the suburbs of New York, by Oakey and Jones, is an elaborate and interesting production. The management of the piazzas includes some notably artistic features, though the small lights, the tinting and obscuration of the lower as well as the upper sash of the windows, and the consequent blotting out of the landscape and outer life when the window is wholly closed, will not strike most people as commendable.

Even such a sketch as this would be incomplete, as regards our country-houses, without reference to a class of wooden marine-villas and cottages lately prevailing at the different watering-places. They are in various modern phases of rendering, but their peculiar feature in common is that the side-frames are left uncovered on the inside, the timbers being left exposed, and being generally chamfered and party-colored. As these houses are built for occupation only during the height of the summer season, the only protection between the inmates and the weather is the outer siding, frequently laid flush and with little regard to or positive avoidance of closeness of joint. One or two that I have seen on Monmouth Beach near Long Island, by R. H. Robertson, present picturesque exteriors, while their interior finish shows a clever and artistic handling of common materials.

It is hard for the old architect who was all his early years nourished on the simple but exquisite lines and the perfectly matured forms of classic architecture, or the glorious masses and wonderful details of the mediæval cathedrals, or the thoroughly regulated and adaptable beauties of the best Renaissance, and who has ever since practised one or more of these types, to look with patience on what he considers the licentiousness or grotesqueness of the strivings in stone or brick, in wood or iron, of the rising generation of practitioners and present race of students. Yet if it be allowed that, for instance, the London Law Courts (which no mediæval architect would have designed, but which never could have been designed if the mediæval architecture had not preceded it) represent legitimate architecture, but nevertheless cannot be descriptively and exhaustively christened under any classification preceding them, and if it be allowed that they are also distinctively English, I am inclined to claim for this country the promise at least of a new school, which will in course of time be recognized as entirely legitimate and as distinctly American. The latest important work of the elder Upjohn, St. Thomas's Church in New York, is — however different in the letter — almost precisely similar to his earliest work, Trinity Church, in spirit; that is, quite or very nearly as much as the former, it renders his ideas in conformity with the traditional rules of architectural grammar. But the younger Upjohn in his Hartford Capitol allows himself considerable freedom of treatment in the direction indicated in the Law Courts (his central dome indeed being a close imitation of that shown on one of the designs for that great work), yet with, I think, a distinctly American flavor. As another example of good work on a large scale, rendered by the grammar of architecture, and yet considerably imbued with the spirit of the hour, may be mentioned the Jefferson Market Court-House by Withers, to which I have previously alluded. I have not seen the Providence County Court-House by Stone and Carpenter since an early stage of the work; but their designs indicated another effort toward a similar combination of mediæval motives with latter-day sentiment. I have already indicated wherein I think old forms and modern sentiment have, under the pencil of Hunt and others, produced combinations still more suggestive of vernacular shades of expression in architectural art. And Furness and Hewitt strike this new key with at least equal vigor and effect in a number of buildings, *e. g.*, their Academy of Design, their Armory, their church on Broad Street, and in the Guarantee Safe Deposit Company's Building, as also in a narrow front near the latter, where the massive treatment is modified in the upper part into a more delicate rendering. Some of their work, however, shows not slight drawbacks in the direction of what may be called the compromise or bridging-over lines between mass and detail. This arises seemingly from hurry or carelessness, or from an unchastened spirit of exaggeration.

As regards the training-appliances for architects in this country during the last hundred years, there is little to be said till we reach a recent date. They consisted until the last decade simply of such as a pupil could manage to utilize for himself out of the business routine and the professional library of a practitioner's office. In such a library the only book likely to be of much value to him, — apart from the history and æsthetics of his pursuit and such functions of it as are interchangeable with those of an engineer's practice, — the only book describing American methods of every-day carpentry and joinery, for instance, was Hatfield's "American House Carpenter." Its pages have been a city of refuge to many a clever draughtsman in transit from the drawing-board to the builder's scaffolding. But after the days of high buildings and iron construction it necessarily lost much of its value. Moreover some of its calculations, though applicable to experiments on a very small scale, are found to lead to supererogatory and extravagant results in the execution of the large masses involved in actual practice. The special tuition given by architects engrossed in fulfilling their commissions could, even if they were fitted to teach, be but slight, and amounted, I think, as a rule, to absolutely nothing in practice until R. M. Hunt introduced a system similar to that which has long prevailed in the *ateliers* of the French architects. Of what has been accomplished among us since in the direction of special training, an idea may be formed by consulting the successive annual reports of the Committee on Education of the Institute, written by its chairman, Prof. Ware, who, as the chief of the Department of Architecture in the Massachusetts Institute of Technology and the correspondent of his several fellow-professors of architecture, stands in the best position to know the facts. He tells us of what has been doing in this matter in his own province, and at the Cornell, Syracuse, and Cincinnati Universities. He himself is the professional offspring of Hunt, who, if the tree is to be known by its fruit, must be considered the father of high and successful architectural education in this country; for among other names than Mr. Ware's, hereinbefore mentioned as producers of some of our most prominent architectural examples of the last decade, there are four more belonging to pupils of his, viz., Furness, Gambrill, Post, and Van Brunt. It is important to know that Mr. Hunt's training was conducted simply on the principle of grounding his students thoroughly in historical architecture, leaving each free to follow his inspirations in striking out a mode of expression for himself; or, if the pupil could not divest his mind of a certain bias toward his teacher's manner, he felt at least an eclectic influence. It is interesting to observe that while the first work of each of the gentlemen just mentioned closely resembles that of the others and of their preceptor, their later subjects show more and more of divergence and of independent treatment; and that whereas the first experiments of Furness in design show the most timidity and least promise, his

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last achievements (how far modified by the influence of his partner, Hewitt, I have no means of judging) show the most audacity certainly, and perhaps the most individualism.

Fergusson says that "if it were possible to conceive the Americans taking the time and trouble necessary to think out a common sense style, . . . they might really become the authors of a new form of art." He adds, somewhat petulantly, "Whatever faults we [the English] have committed, . . . the Americans have exaggerated; and the disappointing part is that they do not evince the least tendency to shake off our errors in copying, which in a new and free country they might easily have done." But I cannot help thinking that if Fergusson were to see some of the work done here in the last decade, he would at least modify his opinion, and own that there is growing up a distinctive school of American architecture, and that Hunt, more than any one else, may be considered its father. Or, if he would not make this admission, I think Viollet-le-Duc would; for though as an architect and archæologist he is more of a mere Frenchman than Fergusson, as an observer and historian of architecture, is a mere Englishman, the former is much more of an artist, and would be more likely to discern and appreciate originality than the latter.

A *résumé* of the facts of the last century, interesting to architects, would be incomplete without adverting, even at the risk of our organization being accused of self-glorification, to our own doings as an Institute.

Our chairman at the last Philadelphia Convention gave us a slight sketch [1] of the precursor of our body, the old Institute, founded forty years ago under the chairmanship of A. J. Davis and the secretaryship of the President of the Convention, Thomas U. Walter, who are, I think, the only survivors of its twenty-five professional members. It had but a brief period of action, and a seemingly fruitless existence subsequently; but it is safe to say that if it had not breathed the breath of life into the idea of association among American architects, our Institute would not yet have been born. Yet we owe at least an equal debt of gratitude to those among us who in 1857 revivified the dormant project, under difficulties arising from isolation and mutual distrust, from professional rivalry, and varying standards of education and habit, which it is perhaps impossible for the younger members to appreciate fully. During the war, there seemed danger that the Institute would again lapse, for it disbanded, though it did not disorganize. After the war, however, it resumed its functions; but, as most of you remember, it was not till 1867 that under the Chapter system it began to lead an active life.

And what, in the nine years of our life as a national organization, have we accomplished? So far as tangible results are concerned, its record lies before you in the shape of fourteen handsomely printed pamphlets suitable for binding together in uniform volumes, and in which the young architect who studies them will find much to his advantage. Four of these pamphlets are on constructional subjects; one gives a sketch of the history of art societies, particularly architectural ones, and discusses the possibilities for the latter; while nine cover the proceedings, in whole or in part, of the Annual Conventions of the Institute since its re-organization under the Chapter system. The Proceedings include addresses by President Upjohn, Dr. Walter, and other members of the Institute, and by distinguished laymen. That of Arthur Gilman, in the first Proceedings, gives an amusing sketch of the old-time commercial architect. I mean the *mere* commercial architect; for the architect who has not a working reserve of the commercial element in him is little likely to be of much service to himself, though he may be partially — he cannot be wholly or at his best — utilized by others in the service of the public. The mere commercial architect however is not dead yet, though the advance of general art culture in the public and the influence of this Institute in its specific art have compelled him to acquire or at least to assume attributes of a considerably higher order than formerly, and to secure assistance that is often adequate to the honest expression of good building-art. For without undertaking to turn itself into a trades-union, or into a mutual admiration society, — of both of which I hope we all have an equal and holy horror, — or to interfere one iota with individual preferences and exigencies in the conduct of their private business by its members, the Institute has already in considerable measure educated the cultured classes of the community to an appreciation of the architect's just claims, and obtained recognition in the courts of a moderately remunerative schedule of rates as being customary and proper; so that even though his "ring" methods may still debar the improved commercial architect from associative recognition in his fraternity, the public is not nearly so apt as it once was to find its ignorance in art and construction met half way by that of the practitioner, and its perhaps correct pecuniary valuation of his poor work met more than half way by his incompetency and his professional throat-cutting; and consequently it is not so apt as formerly to suffer in his productions. An address by R. G. Hatfield suggests some much-needed practical methods for supplying deficiencies of qualification in practitioners, though they should be cautiously applied if the mental independence so necessary to creative functions is to be preserved intact; and one by Wight clearly emphasizes the evils resulting from the isolation which architects, sometimes simply through a morbid development of the artistic temperament, but frequently also through sheer egotism, so frequently enforce on themselves, and through themselves on the public. The proceedings also include a number of papers and debates on constructional and æsthetical subjects, and the annual reports of the various Chapters and committees of the Institute, among the last being the instructive reports of the Education Committee, and the invaluable observations, full of suggestions for future utilization, of the Committee on Professional Practice, both of them the work of their chairman, Mr. Ware. Among the addresses made to our Society by persons outside of the profession will be found one by E. L. Godkin, editor of the *Nation*, on professional guilds, and others by President Eliot of Harvard, President Runkle of the Massachusetts Institute of Technology, Hon. Rufus King of the Cincinnati University, and Emery A. Storrs of Chicago; while in the closing address of the Rev. Dr. Furness, at the previous convention in this city,[1] we have perhaps the best word, as regards appreciativeness, fitness, tact, and beauty, that has ever been spoken to an active body of our calling by a non-architect. Properly disclaiming any authoritative knowledge of the opulent alphabet of our art, as every layman will who has studied its first letter, and begins to realize that an approximate mastery of the whole subject is the work of half a lifetime, he nevertheless shows such a sensitiveness and receptivity to the spirit of architecture, and such an insight into our present conditions and into the possibilities among us for developing that spirit into shape and translating it into our vernacular, as would form the best possible starting-points for any young architect having the will and ability to achieve an artistic success in conjunction with a commercial one, consonant with self-respect.

For many years the trained portion of the profession have regarded the establishment of a literary and illustrated serial organ as a desideratum of the first magnitude; and the subject, always mooted in the Institute, was taken up as a practical question not long after its re-organization into Chapters. It is true that within the last three or four decades various publishers had a number of times attempted to supply a similar demand developed on a low scale. Some of us can recall Ranlett's *Journal* published nearly thirty years ago, and a number of subsequent experiments, generally living a brief existence under some title inclusive of the words "architect" and "builder." Apart from their character as commercial ventures, they generally showed the best intentions on the part of the transitory editors and their collaborators; and they undoubtedly prepared their very limited public to hope and indirectly to prepare for better things; while one, issued I think in Cincinnati, and conducted by an architect of the name of Hamilton, showed decided indications of both literary and artistic ability. But it was not until the appearance two or three years ago of the *Architectural Sketch-Book*, edited by the Portfolio Club of Boston, and of the *New York Sketch-Book of Architecture*, for the conduct of which we have been indebted, it is understood, to Mr. C. F. McKim and Mr. Stanford White, that any thing in this way, commensurate with the

[1] See Fourth Annual Proceedings, p. 207.

[1] See Fourth Annual Proceedings, p. 247.

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wishes of the upper ranks of the profession, was accomplished. Simultaneously several members of the Philadelphia Chapter, in conjunction with some fellow-artists of the easel type, issued a series of etchings illustrating their work in both kinds. It lived, it is understood, but a few months. The two others still continue. As, however, they are and were exclusively devoted to illustrations and the briefest possible description of such, the literary element of the profession remained unutilized. And as literature is the only solvent of all specialties in the conduct of life, and not the least of those in art, and as no specialty can achieve its maximum rank and influence without the practical application of its own literary element, these facts decided the Publication Committee not to relax its efforts. It continued a correspondence with various publishers which had already extended over several years, and at the last Convention of the Institute reported a scheme arranged with the well-known publishing house of James R. Osgood & Co., for the establishment of an architectural organ of high character, both as regards its literary and artistic sphere, to be under the editorship of one of our Fellows, a graduate of Harvard, W. P. P. Longfellow, — a name already renowned in that art which is as exquisite as music, as old as the pyramids, and as universal as human affections. The project was unanimously indorsed by the Institute; and a few weeks after, on the first day of the present year appeared the first number of the *American Architect and Building News*, which, if liberally managed and replenished by the pen and pencil contributions of architects who know how to use either, can hardly fail to become as a lamp to our feet, and a shield to our arms in our daily strife with the ignorance both of ourselves and of the public.

Through its component parts — the Chapters — the Institute has partially improved the building-laws of the country in various localities. It has called public attention to the deficiencies and evils of the public service in relation to the national structures, and it has through one of its members attained temporary vantage ground for improving that service.

Much more it has done that cannot be measured or written. And whether he recognizes it or not, whether he supports or contemns the Institute, there is no young architect whose position and prospects are not improved by it.

Wherefore the Institute proposes to go on with its legitimate work. It proposes to carry forward to completion the structure it has already reared on the foundation of its constitution, "to unite in fellowship the architects of this continent, and to combine their efforts so as to promote the artistic, scientific, and practical efficiency of the profession." It proposes to have the laws in relation to public health and safety, as connected with buildings, perfected. It contemplates a permanent foot-hold for the "right man in the right place" to improve and regulate by the use of the best-trained genius and talent in its speciality, the national, state, and municipal architectural service of the country. It proposes to co-ordinate local practice so that it may everywhere enure to the common good, as far as that practice will bear co-ordination, without losing vitality and color. As one among many needful steps to this end, the revised formula for a general building-contract as provided for at the last Convention will presently be laid before you. It is very unlikely that any of its provisions will suit the exigencies of all localities, or that any of the various architects throughout this broad land will accept it without change, omission, or addition; but it may well be adopted as the skeleton, in whole or part, of American building-contracts, and will, it is hoped, prove an efficient aid to that unification of the exoteric relations of the profession, which is indispensable not only to the best attainable conditions between architects and their clients, and to the adoption of the best architecture by the public, but indirectly to maximum opportunities for that esoteric development without which the attempt to produce such architecture must fail.

There is much more to do in this direction. At the last Convention in this city, an attempt was made to regulate the competition system, a very difficult subject, but perhaps not impregnable to amelioration. As the country progresses in population and wealth (for "panics" and "hard times" do not permanently affect the onward course of a growing nation) the practice — necessary where the centres of activity are so widely separated — of superintendence by proxy will inevitably become not uncommon. Very considerable diversity now exists in the local interpretation of the various technical terms used in building-operations, as is evident at every convention where the debates turn on technical points; and the necessity for co-ordinating them to a common standard is becoming imminent. This will have to be accomplished before the success of another desideratum — which might also be made a potent co-ordinative agent — can be assured; that is, of a manual suitable for the every-day use of an American practitioner or assistant, a thorough pocket companion, containing the prices for all kinds of building-material and labor, as well as time-saving formulæ for the calculations as to quantity and strength of materials, etc., he is constantly required to make. These *vade-mecums* are produced in great perfection in Europe to suit the various countries there, though they might be raised to a higher grade than usual, and made serviceable to the architect in his relations with possible clients, as well as with assured ones, by briefly giving the main dates in the chronology of architectural forms, as also the particulars and parallels, so far as expressible in figures, of the principal buildings in the world; as well as much other serviceable material that might be compressed into brief space. But even the best of those published for the English market are, owing to the great differences in American terminology, and in the methods and material of construction, almost valueless to the cis-Atlantic practitioner. It is true that there have been at least two attempts to supply the American public with such a work, — one, the "Contractor's Manual and Builder's Price Book, by A. Bryant Clough, architect," published in New York in 1855; and the other, which is but four years old, the "Architect's and Builder's Pocket Companion and Price Book, by Frank W. Vogdes, architect," published in Louisville. The first was such a thoroughly crude and illiterate performance, that the information it gave, even when trustworthy, was almost valueless for purposes of reference. The last is a considerably better production, full of valuable information, but not well arranged or indexed, and otherwise below the standard the Institute should set for itself in fathering such a work. A catechism for architectural pupils of construction, applicable to American materials and methods, and one suitable for popular reading, concisely covering the history and æsthetics of architecture are both greatly needed; and the Institute could do few better things than oversee the preparation and distribution of such aids to the production and appreciation of good work. Good formulæ for specifications, as well as one for a building-contract, are needed in American practice. Some of the cheap building-publications have done something in this direction for inferior classes of structures; and William T. Hallett has had some similar documents published, but the ground covered is too local. The matter properly comes within the province of the Institute, and if carried out to completion would form another strong link toward inter-professional union and another good service to the public. Another thing, and not the least important, remains to be mentioned; though this should be an affair of the Chapters, and only referred to the Institute for purposes of co-ordination, — that is, the establishment of schools having large outdoor areas connected with them, wherein the various constructive processes of the building-art could be partially learnt by students, through the medium of skilled artisans, with whom arrangements for the purpose could be readily and cheaply made; for though assiduous and conscientious practice is needed to attain the very useful and honorable position of a genuine skilled workman (which is recognized in the large remuneration he commands) the processes by which the position is attainable are easily and may be very quickly learnt. Students could under such a system themselves handle the trowel and plane if they should see fit, — though there would be little need to use their hands at all if they should use their eyes properly, — and acquire the most thorough conversancy with the detail and dialect of practice on its lowest plane, without the slightest risk of submerging their æsthetical and creative qualities, as they most likely would if they should enter

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an artisan's workshop as apprentices under the grievously mistaken notion that they would learn to be "practical" by so doing. They would, on the contrary, be committing artistic suicide. Nine-tenths of their time — the precious seedtime of youth — a thousandfold better employed in geometrical, freehand, and perspective drawing, and in the study of the literature of their specialty, would be absolutely wasted for professional purposes. Nor need they by resorting to such an outdoor-work school as I suggest, be in fear of losing a particle of social prestige, as they would be by adopting the other alternative; while the practical gain to them in their after-intercourse as practitioners or assistants with artisans would be simply immeasurable. A thorough knowledge of the various kinds of material and workmanship would become a part of their capital. The various kinds of bricks, and the various kinds of mortar and bond in which to lay them, the various woods and the various uses of the timbers, planks, etc., into which they are cut, the differences of qualities and methods in material and constructive treatment of stone, iron, and other metals, slate, tiles for roofing or for decorative purposes, terra-cotta, etc. — all this would be as familiar to them as the use of the T-square; and being thus familiar with them, the limitations they impose upon the student's powers of invention would be appreciated and acknowledged in his designs; while, on the other hand, those powers would not be unnecessarily curbed and thwarted by his dread of the unknown quantity. Their true and really very inferior proportions in the broad scope of artistic creation would be recognized; and the young architect would be saved the humiliating feeling, with all its evil consequences to the creative faculty, which leads him when he leaves his drawing-board for the outdoor work of construction, to overrate and defer to the so-called "practical" man, who knows nothing outside of his little technical rut. I think the committees on education of all the Chapters share a common feeling of disappointment as regards the results or rather the non-results of their efforts in behalf of the Junior members. The New York Chapter has thoroughly tested the illimitable capacity of the students and draughtsmen in our profession for refusing, or perhaps I should say for being unable, to avail themselves of the offers made to them of the absolute and exclusive control of all the appliances of that Chapter at stated and frequent times; and I, for one, have made up my mind that the stars in their courses are not more certain than the operation of laws resulting from differences of age and of professional and social conditions, the latter quite as often in favor of the Junior as of the Senior, in preventing fellowship on terms of equality, the only kind of fellowship that can conduce to self-conscious improvement, between the practising Seniors and the subordinate Juniors of the profession. But if such outdoor schools as these were established, the Juniors would feel that that most pressing need, the acquisition of "practical" knowledge which leads them till they discover the difficulty of association with their practising elders, to seek for it among those of long professional experience, would be met without any loss of the self-respect so essential to the artist, and the self-assertion so dear to republican youth; while the work of assimilating the rising generation of our co-specialists with the Institute, before being deteriorated by close professional association with and dependence on an inferior class of architects would be a very much easier one than it now is.

But to do all this, or any considerable portion of it, we must increase our numbers, means, appliances, and opportunities. We have done much of missionary work by correspondence, but almost nothing in person; and those who have had most to do with the formation and administration of wide-spread organizations will, I think, concur in asserting that while one autograph letter is equal in result to any consecutive number of printed circulars, one face-to-face interview between possible proselytes, and a missionary who believes in his mission, is, as a rule, worth a hundred autograph letters; though occasionally, under certain circumstances, a letter may carry more weight than an interview. To do this, we must find modes of harmonizing the central and local exigencies and responsibilities of our Federal organization. This is the key-note struck by Mr. Van Brunt in the Annual Address of last year; and by various documents which will be presented to you before this Convention closes, you will discover that the question has in the interim been a prominent one in the minds of both central and local representatives. Perhaps we might get some serviceable hints from the methods of our sister Society of Engineers, on questions of membership, finance, and current administration. One thing is notable, — that since that body has discarded what may be called the amateur system of management, its membership and its revenues have trebled. Yet we shall probably be disappointed if we expect too much from the engineers' body in the way of suggestion; for while the two societies work on a common basis in some points, just as the two professions represented by them sometimes touch closely in their every-day practice, there are nevertheless, in the one case as in the other, wide divergences. At some points engineering and architecture overlap each other; but since the days when Leonardo in his practice united applied science and art in equal perfection, the professional divergence of architect and engineer has widened more and more, at least in the metropolitan centres, though in smaller ones the two professions are still, to a considerable extent, united — for the same reason that in a village store, groceries and ribbons are sold over the same counter. It seems to me moreover, that the practitioners in a profession which has mathematics for its exclusive basis must necessarily possess elements of cohesion greatly in excess of those existing among the professors of a practice which is indeed also based on the eternal foundations of mathematics, but into every stone and every line of which enter, in addition, more or less of the imponderable but exacting factors of that everlasting spirit of beauty, which admits of — which indeed, as human nature is constituted, necessitates — endless forms of concretion, and the sharpest rivalry, the intensest partisanship, especially among the young and undisciplined, on perpetually recurring questions of method and style. It seems to me, the same causes which have produced this divergence will always operate to give an association of engineers a great advantage in numbers over an association of architects in the same community; and, consequently, in revenues derivable from membership. Moreover, comparing the large number of practising engineers resident in the United States with the list of practising architects, it is probable that the margin of difference in the inclusiveness of the two organizations is not so wide as may appear at first blush. But whether on the one hand, our body is too loose in the qualifications it demands in professional members of the higher grade, or on the other it is too exact in its requirements for those of the lower grade; whether again, in a federation covering a large territory, — the civilization of which ranges in degree from the roughness and crudity of frontier life to a high standard of culture, — it is not necessary to relax the qualificative demand in favor of the most indulgent consideration of the mere question of locality, — all this requires serious consideration, and will sooner or later demand discussion. All associative bodies, all parliamentary bodies, must perforce practise equality, from the Christian Church and the United States Legislature, down to the village debating club. The blessing of the hierarchal primate counts for no more than that of the village deacon; the vote of the backwoods representative has equal efficacy with that of the most learned and most distinguished senator. In a certain sense the highly qualified architect loses by associative work with the poorly qualified one; and *vice versa,* in a certain sense the ill-qualified architect loses by association with the well-qualified one; but in a third sense they both gain much more than they lose. "Man shall not live by bread alone," neither can he fulfil his duty to society and to his speciality by acting the part of a big sponge. The sprat-swallowing whale of commerce and finance may be unavoidable in the market-places and on the exchange; but in art, the smallest contribution of the most obscure member to the general stock of ideas is as valuable as the acquisition of fact from any source is to the man of science. He cannot afford to do without it. There is a moral gain in fellowship which overleaps exterior barriers, and fructifies the intellectual powers which form the artists' capital.

In our deliberations we must realize that the work of the Institute is past the period, if ever that period

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existed for it, when *dilettante* or sporadic methods of administration can be otherwise than a stumbling-block and foolishness. Those who have borne the heat of the day may well feel relieved, so far as their mere personal comfort is concerned, if their burdens are removed to other shoulders; but they can but feel anxious lest the painfully gathered fruit of their long labors should be imperilled by inappreciation of the amount of current work involved, and by inaptitude for the very exceptional handling it requires. It is true that after a perfect system of book-keeping and collection has been organized for a working body, its revenue, if small, may be gathered at a very trifling outlay of simple clerical labor. Figures are constants which know no shadow of turning, and are moved by no considerations of the past or present or future. They are amenable neither to fear nor hope, to experience nor inexperience, to love nor hate, to suspicion nor rivalry. Imagination sets no trap, aspiration has no lure, unbalanced ambition holds no scourge for them. But when the factors of the problem to be solved are human, the case is far different. It is no child's play to harmonize the views and elicit methods for securing the best interests of those — old, middle-aged, and young — who approach the same subject from many varying points of the physical, mental, educational, and moral compass. And when that subject embraces the vital issues of professional reputation and daily bread, and combines inseparable elements that deal on the one hand with the coarsest and most intractable of materials, and on the other soar to "the highest heaven of invention," the task of constructing an available platform for the whole body is as difficult as can well be imagined. The amount of correspondence — both perfunctory and special — it involves is equal to that of many average practitioners put together; and the qualifications it demands for its special work are of no low grade, certainly not inferior to those required for securing and carrying on the most extensive and the most important personal practice; while the selfishness and unscrupulousness, the time-serving and charlatanry, so often employed with long-continued *éclat* in private enterprise, are altogether unavailable for the stable and permanent success of artistic or indeed of any other kind of federations which, apart from the satisfaction of carrying out a high and beneficent public aim, have very little to offer their daily workers but barren honor, hard labor, and the irresponsible fancies, the suspicions and hypercriticism, of ignorance, incompetence, discontent, or jealousy.

The current administration of the Institute in the multiform, delicate, and complex duties which environ it cannot now — if ever it could successfully — be carried on by any lay figure. There is here and there in the combinations of a community, a man whose achievements and record in his speciality are so shining, that his mere name becomes valuable to his fellows, and forms a fitting and desirable figure-head to the ship that carries them all. When he is wanted, the crown is thrust upon him, whether he will or no. But so far as its daily working-appliances are concerned, such a society as ours, working without adequate means for its due position among the working forces of its community, cannot afford to be used in his own interest by any secondary figure-head. Nor can it afford to be used by the alert egotist who — whether with sincerely public-spirited or merely selfish intentions, or with a mixture of both, makes little difference to the results — sallies from one organization to another, and, talking his way into the working departments of all, yields free reins to his imagination, which is apt to be much in excess of his knowledge and of his powers for sustained effort; and gives endless labor to his coadjutors, by the continual ransacking of mare's-nests and by incessantly initiating steps which, whether made in good faith or as a means of self-advertisement, frequently lead nowhere; and the sequences of which, if there be any, he leaves to others to drudge over, himself meanwhile taking the credit of their labors. No, what our Association needs above every thing, what is indispensable to the permanent success of any organization of practical aims and broad scope, after its mere preliminary steps are accomplished, is that its current administration shall be conducted, not on a desultory amateur system, but as a paramount obligation. For the consumption of time, faithfulness, industry, sagacity, and tact needed for the success of our Institute is very great; but if we expend them, the reward will be correspondingly great, and perhaps not so far off as we might suppose.

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